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NATIONAL

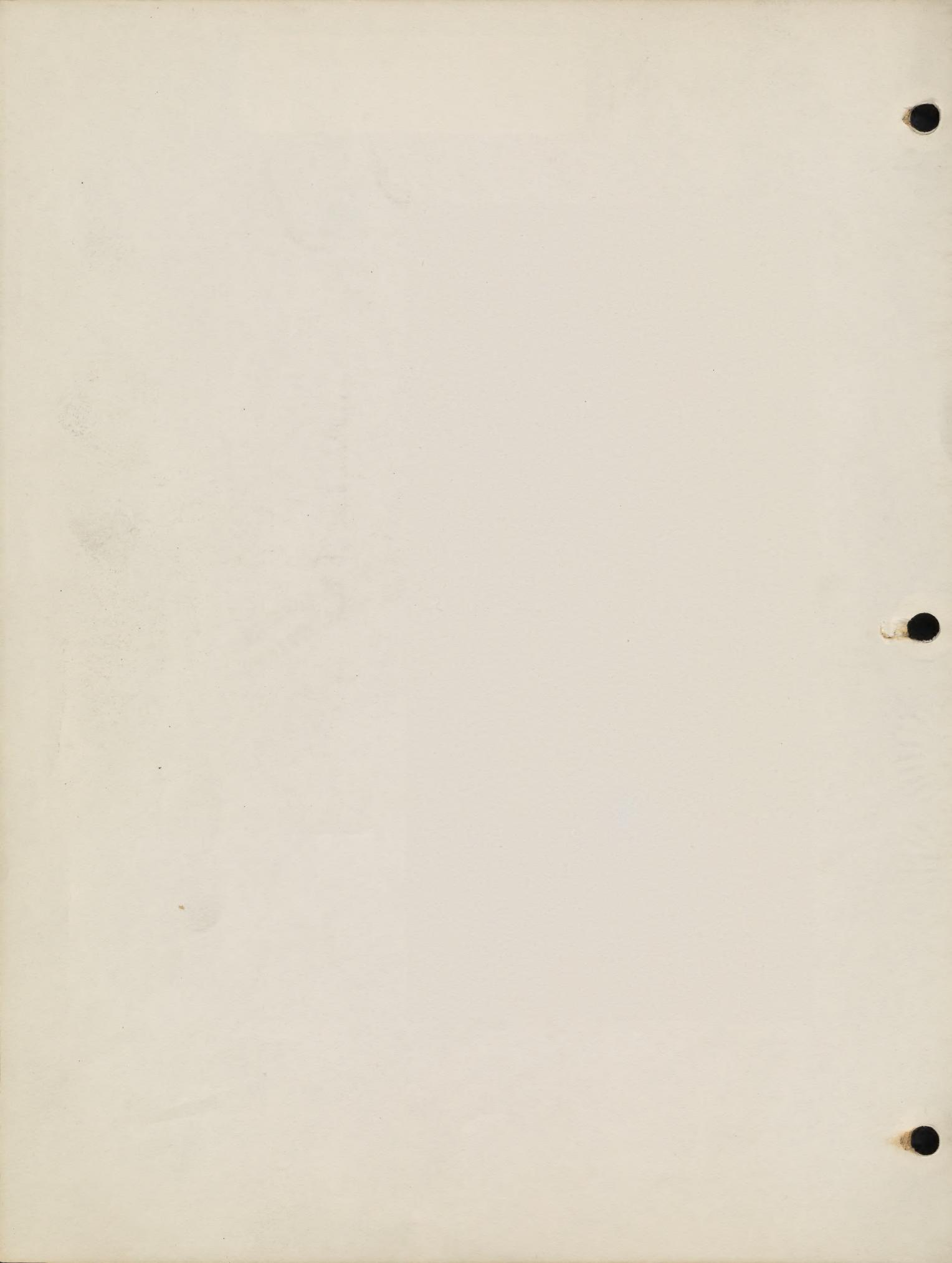
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VITAMIN A DEFICIENCY
AND OTHER FACTORS
CONTRIBUTING TO
DISORDERS OF THE
REPRODUCTIVE AND
URINARY SYSTEMS
OF CATTLE.



B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Close-up of heifer 33. This animal is day blind -- note dilated pupils. Apparently normal vision returned after alfalfa leaf meal was added to the carotene deficient ration (see previous picture).

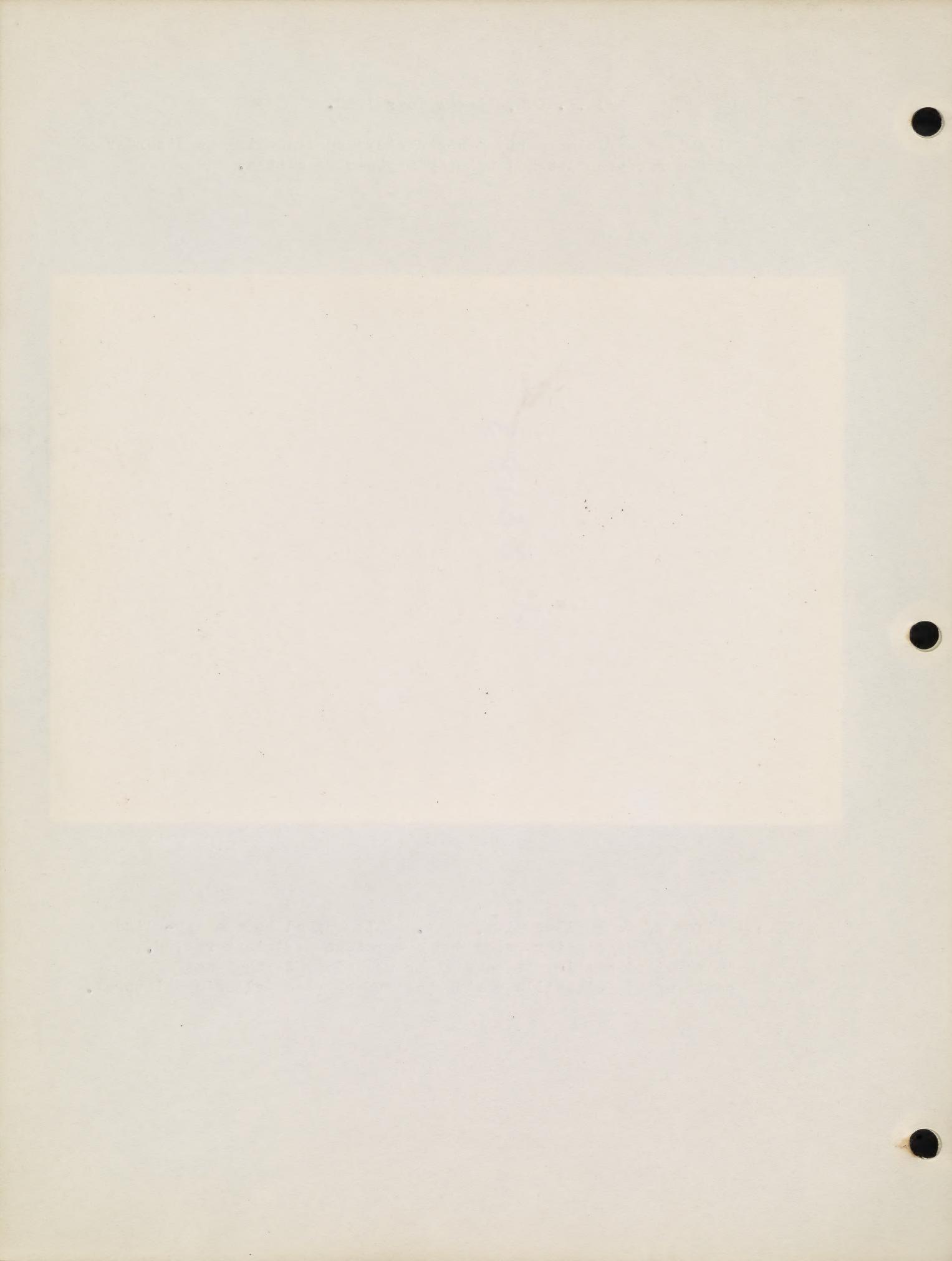
B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



Neg 68638

SUBJECT: Heifer 33 from Miles City, Mont. This animal became day-blind within 60 days after being fed a carotene deficient ration. This heifer was in the same group as heifer 37 that was pastured at Beltsville during the summer (see following picture).

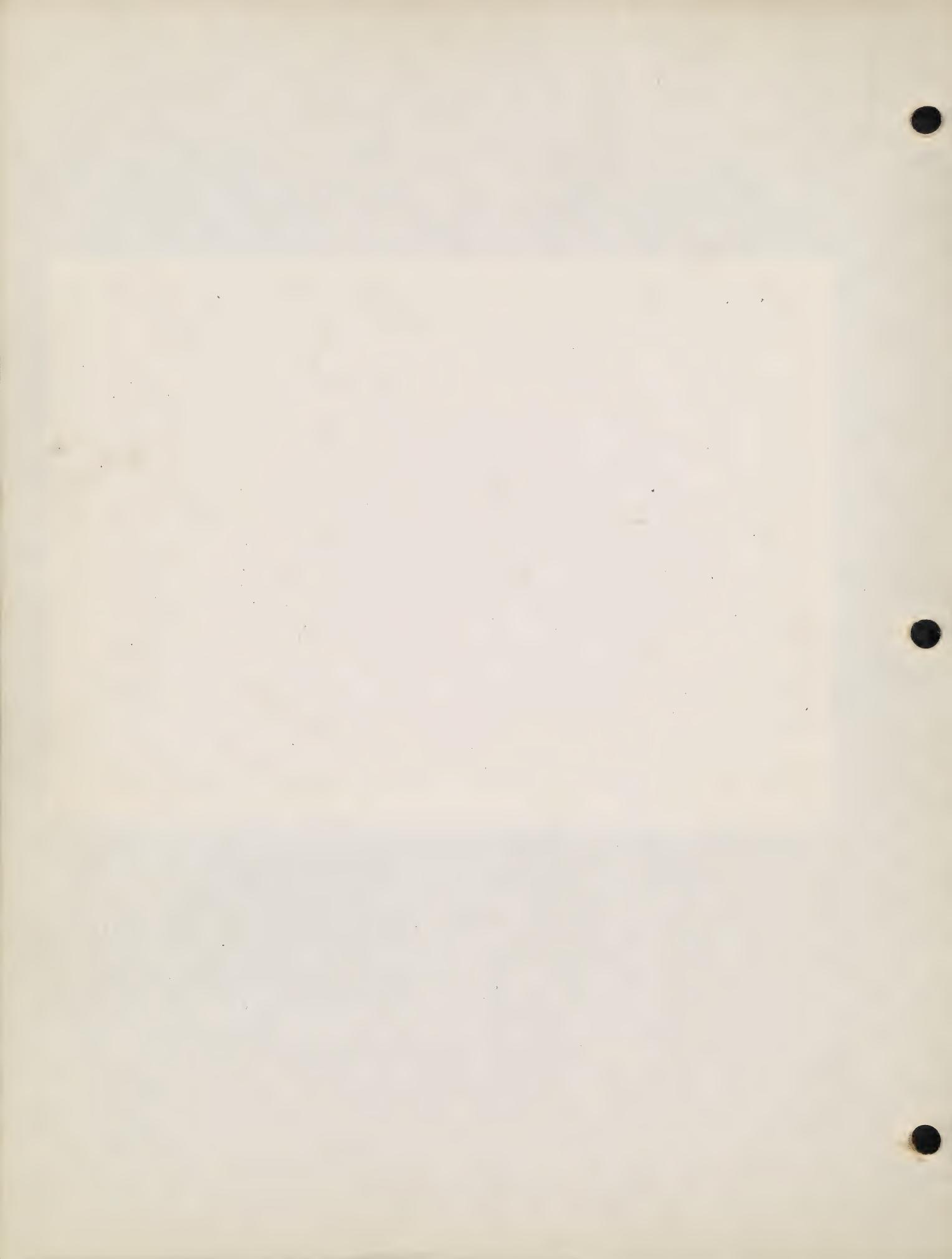


B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.

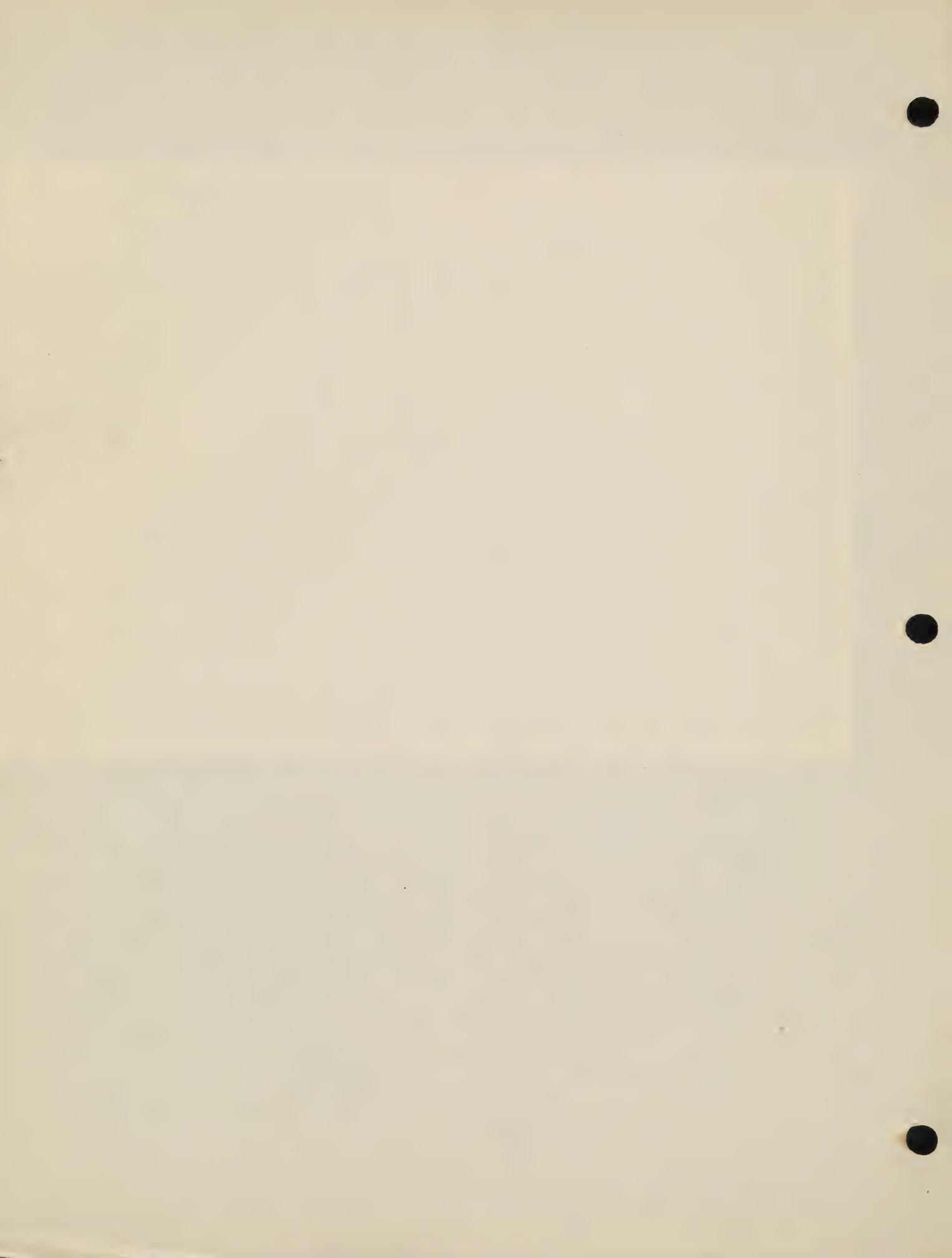


SUBJECT: Heifer 37 from Miles City, Mont. This animal became very weak, unsteady on her feet and her blood carotene and vitamin A values indicated vitamin A deficiency after 60 days on a carotene deficient diet. This animal had been on good pasture at Beltsville before going on experiment.



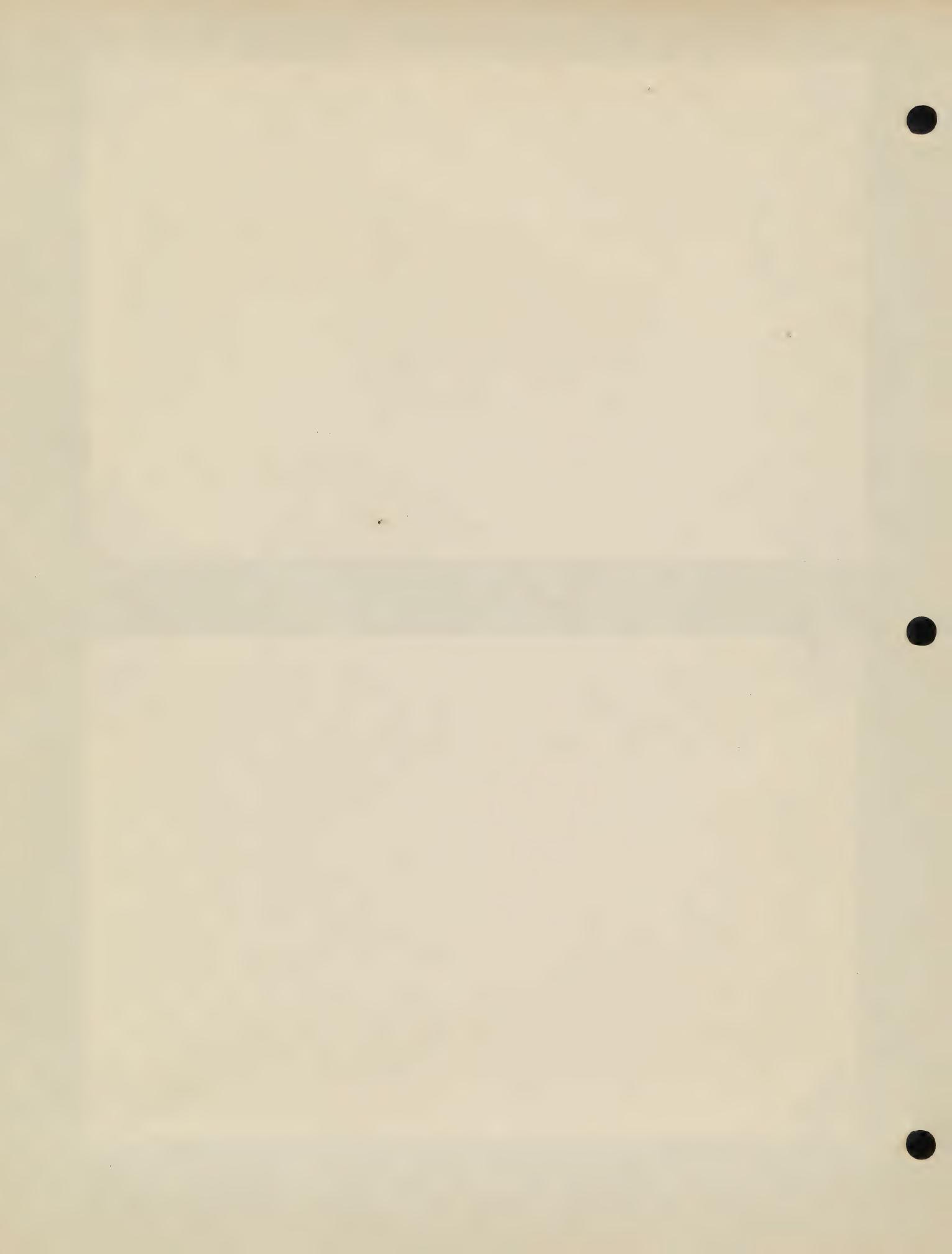


777703
1951-3-27











Heifer 48 - Negative 69244-B, taken 10/11/40.

Although still in good condition, this heifer is permanently blind as a result of vitamin A deficiency. Note exophthalmos, or "pop-eye", swelling (edema) of the legs, shoulder, and brisket.

Cow 48, Negative 69242B, taken 10/11/40
Experimental case of Vitamin A
deficiency. Note exophthalmos, or pop-
eyed appearance, seen in such cases with
blindness. Also note swollen legs,
shoulders, and brisket. Experiment,
Beltsville, Maryland.



Cow 48, Negative 69245B, taken 10/11/40
Same animal as above - note swollen
hocks.



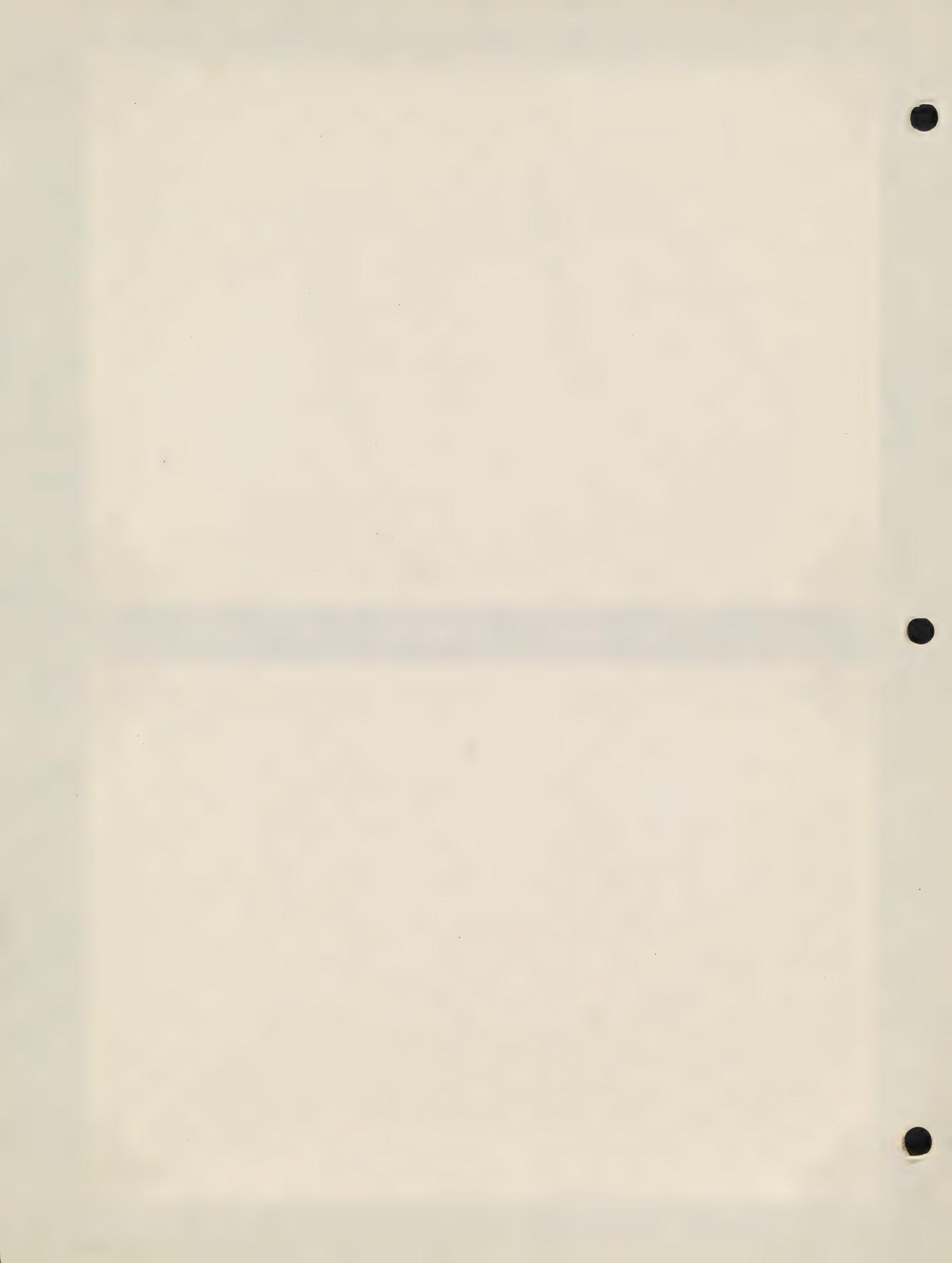


Cow 48
- Negative 69484-B, taken 11-29-40.
Recovered after addition of vitamin A, through the
administration of cod-liver oil. Note the complete
disappearance of swelling in the brisket and front
legs.

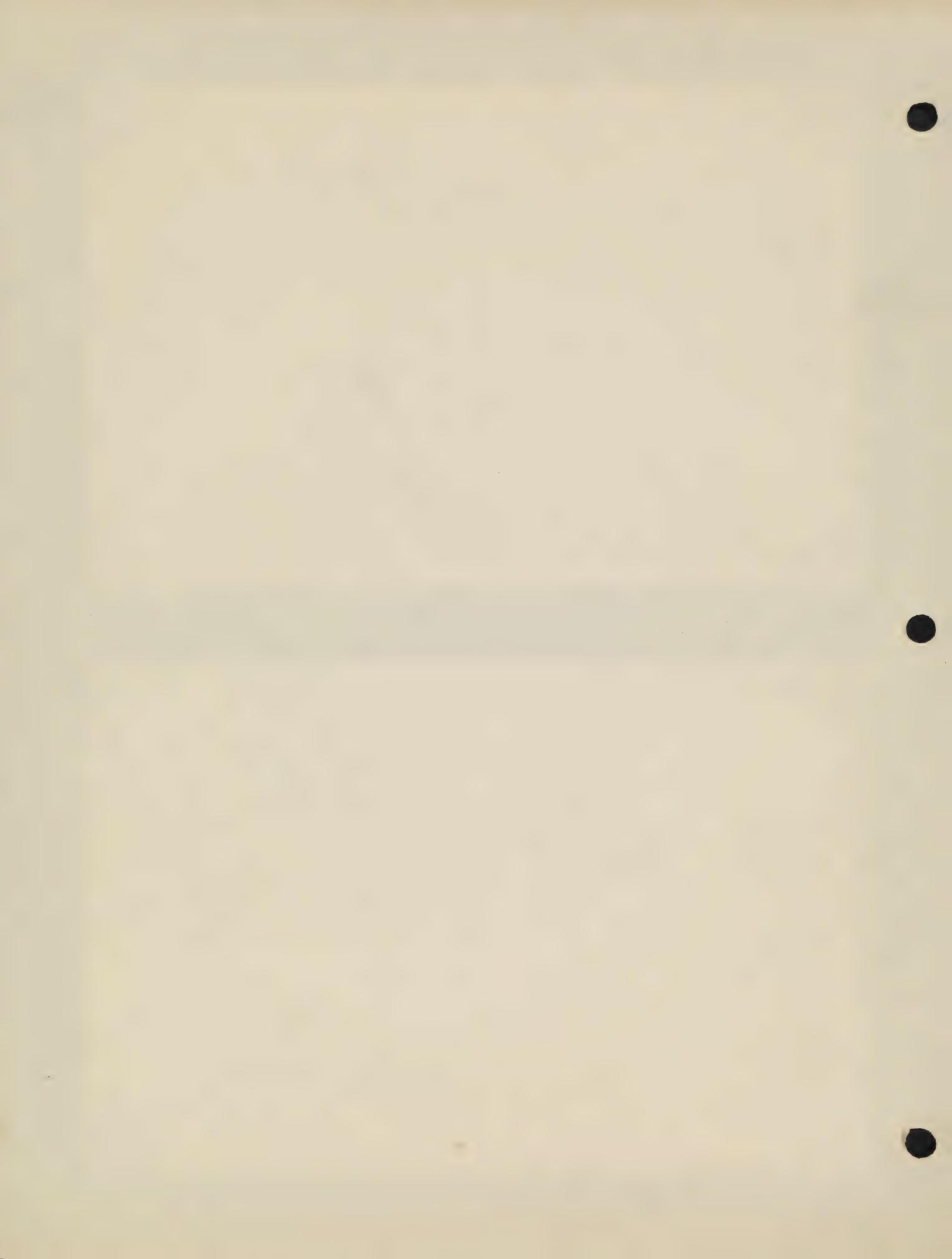


Negative 69238-B, taken 10-11-40 (born spring of 1937)
Anasarca, believed caused by vit. A deficiency
occurs in dry-lot fed cattle that have been on
carotene rations for 10 months or longer)

69238-B
10-11-40
6948







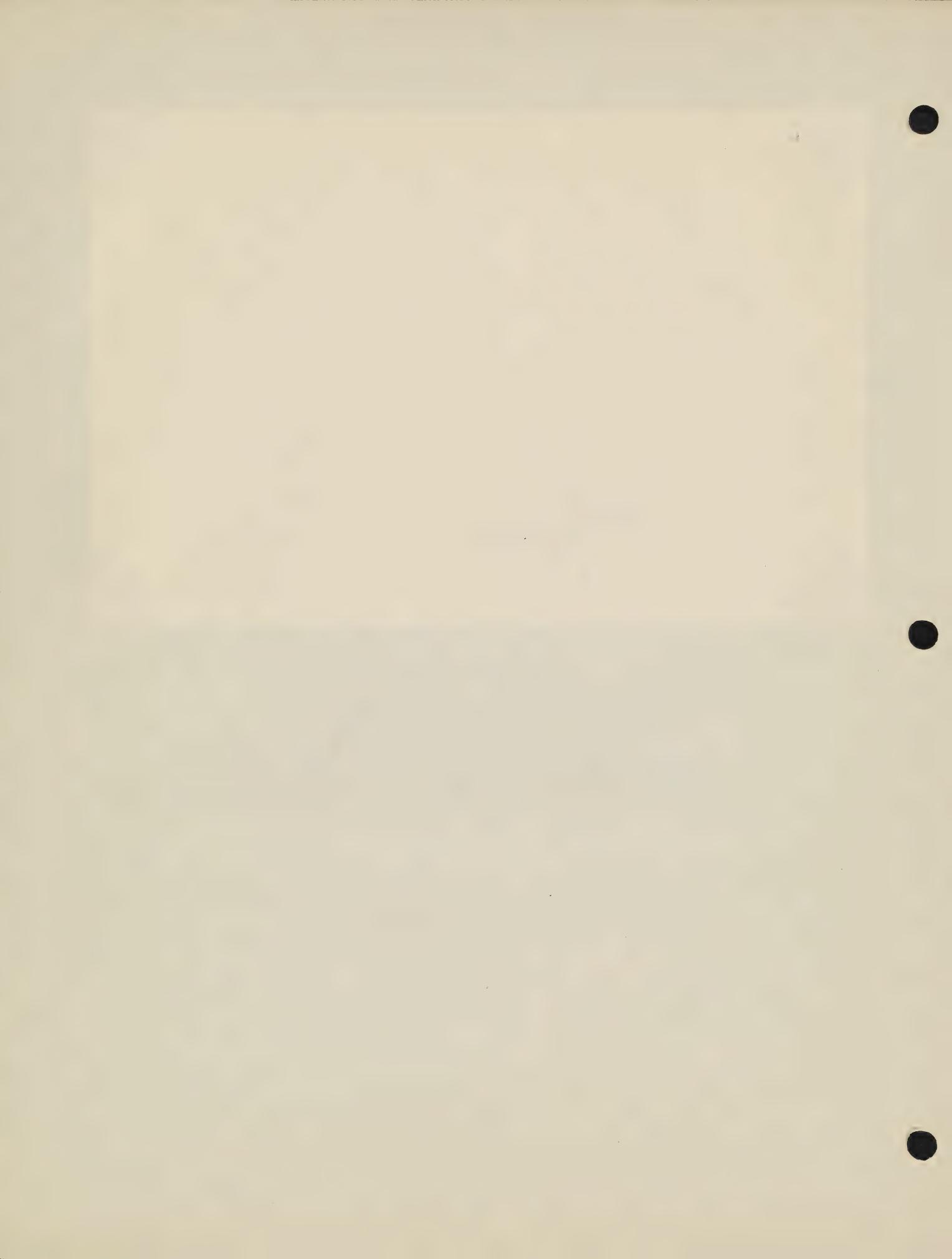
B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cow 78 and her first calf (No. 3) at 37 days of age. (see earlier picture). At this time the calf had a severe diarrhea, had occasional convulsions, and was not as active as usual. The calf died 7 days later (see movie day before death). Note the excellent condition of cow 78; she is apparently normal.



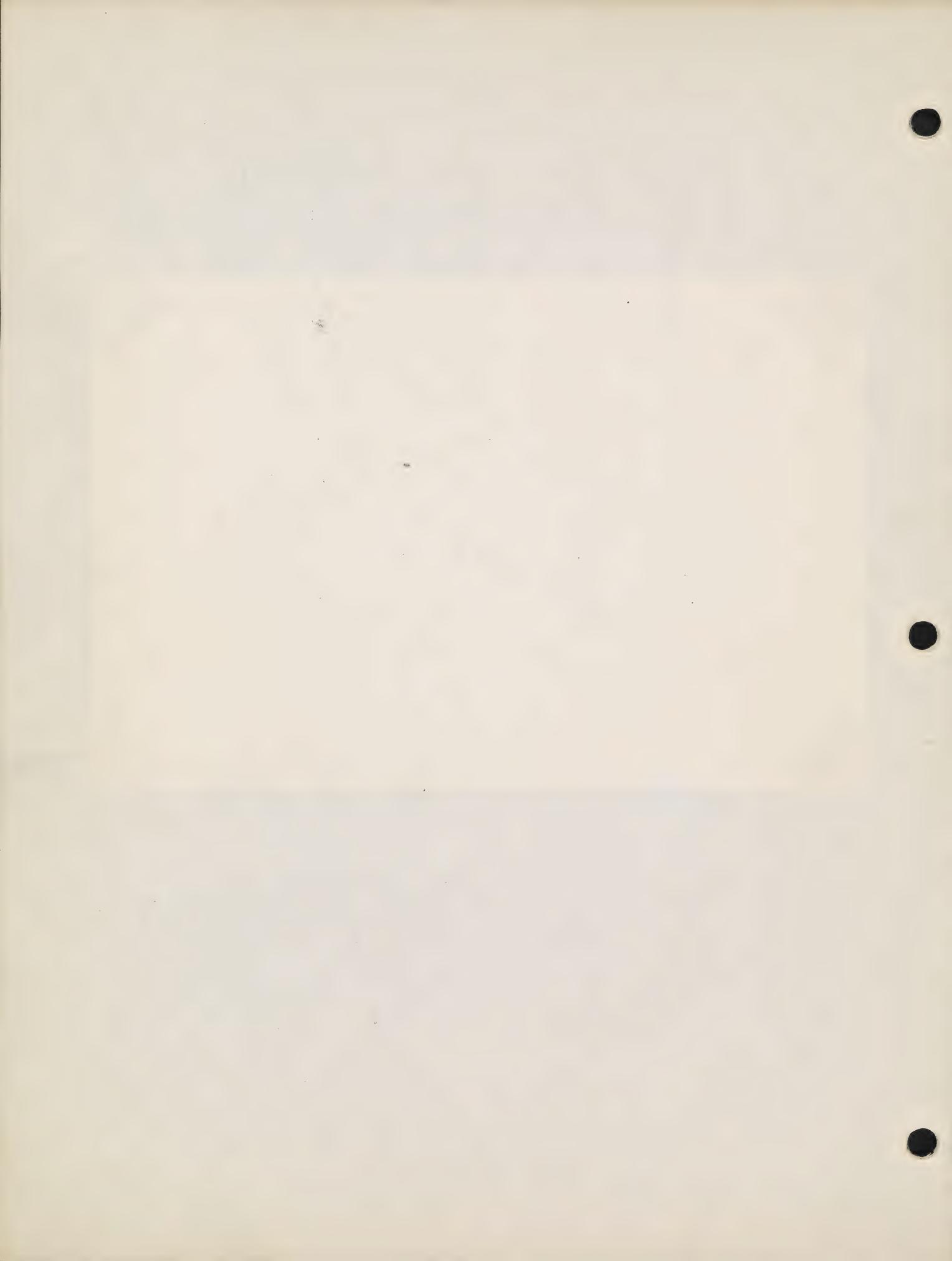


B.A.I. 605, Fiscal Year 1940

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cow 78 and her first calf (No. 3) at 16 days of age. This cow received 45 micrograms of carotene per kilo of body weight. The calf was born blind but definitely stronger than calf 2, from cow 173 on the 30 microgram level. This calf developed convulsions, one of which was photographed on moving picture film. The calf died at 44 days of age and the principal findings at autopsy were old navel infection, abscess in urinary bladder and cystic pituitary.

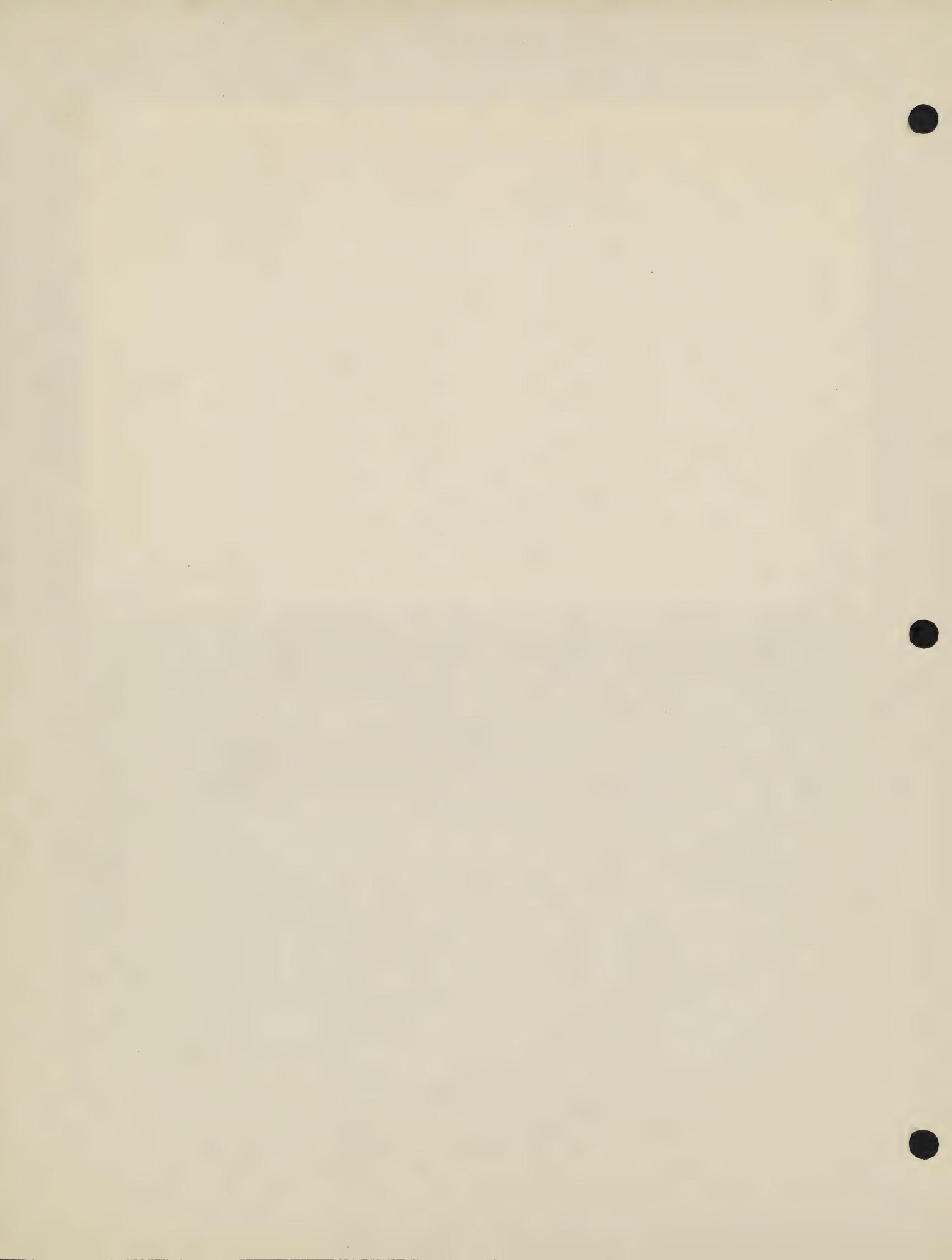




Cow 98.1 and calf - Negative 69848-B, taken 8/11/41.

Calf born August 7, 1941 to heifer receiving 60 mcg. carotene per kg. body weight daily. Calf apparently normal. Weight of calf at birth 30.6 kgs.

98.1 + Calf 8-11-41
69848-B

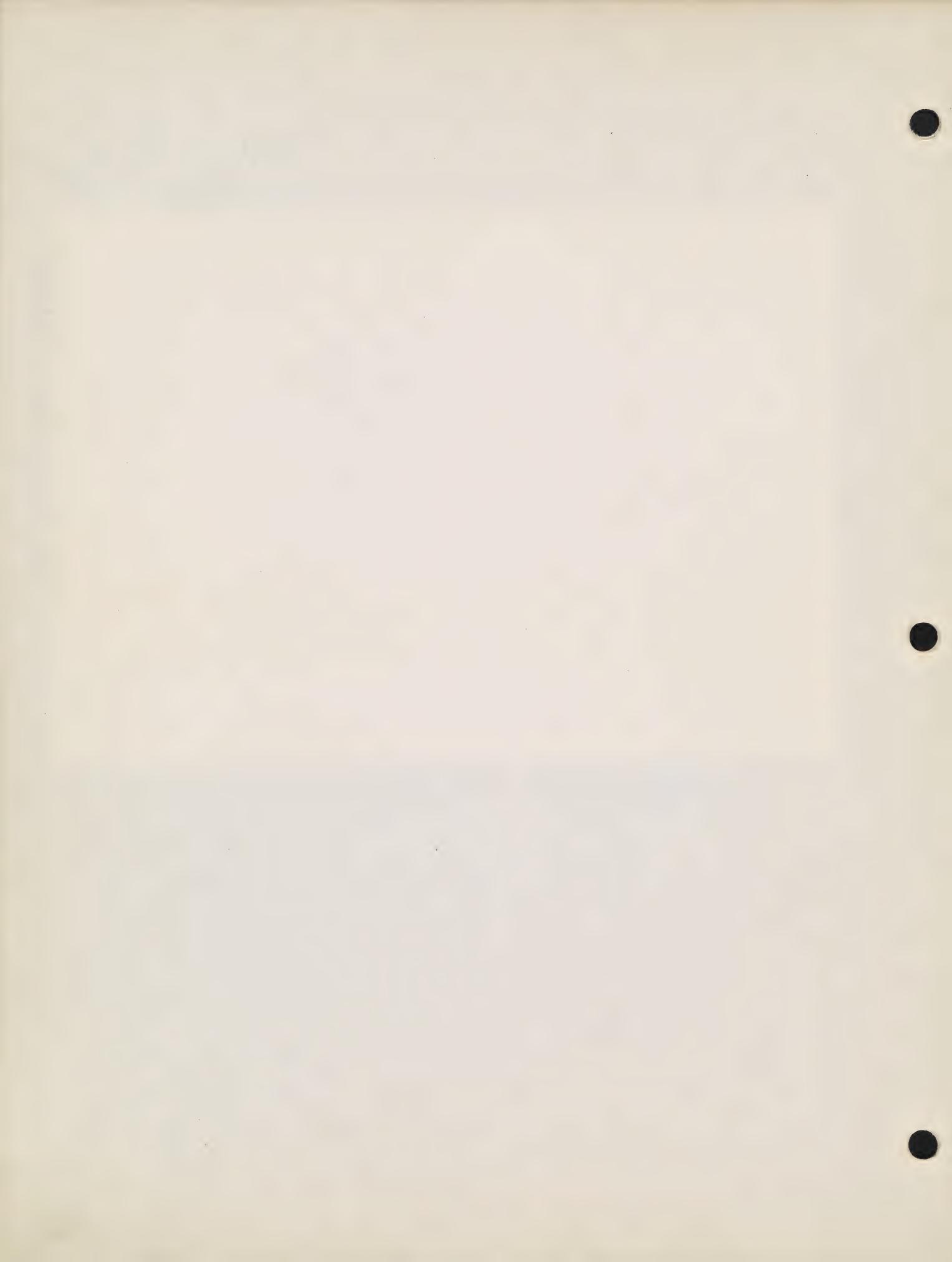


B.A.I. 605, Fiscal Year 1940

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cow 166 and her first calf (No. 4) at 2 days of age. This calf is apparently normal but the dam is very nervous and would not stand for a photograph. This cow is receiving 60 micrograms of carotene per kilo.







B.A.I. 605, Fiscal Year 1940

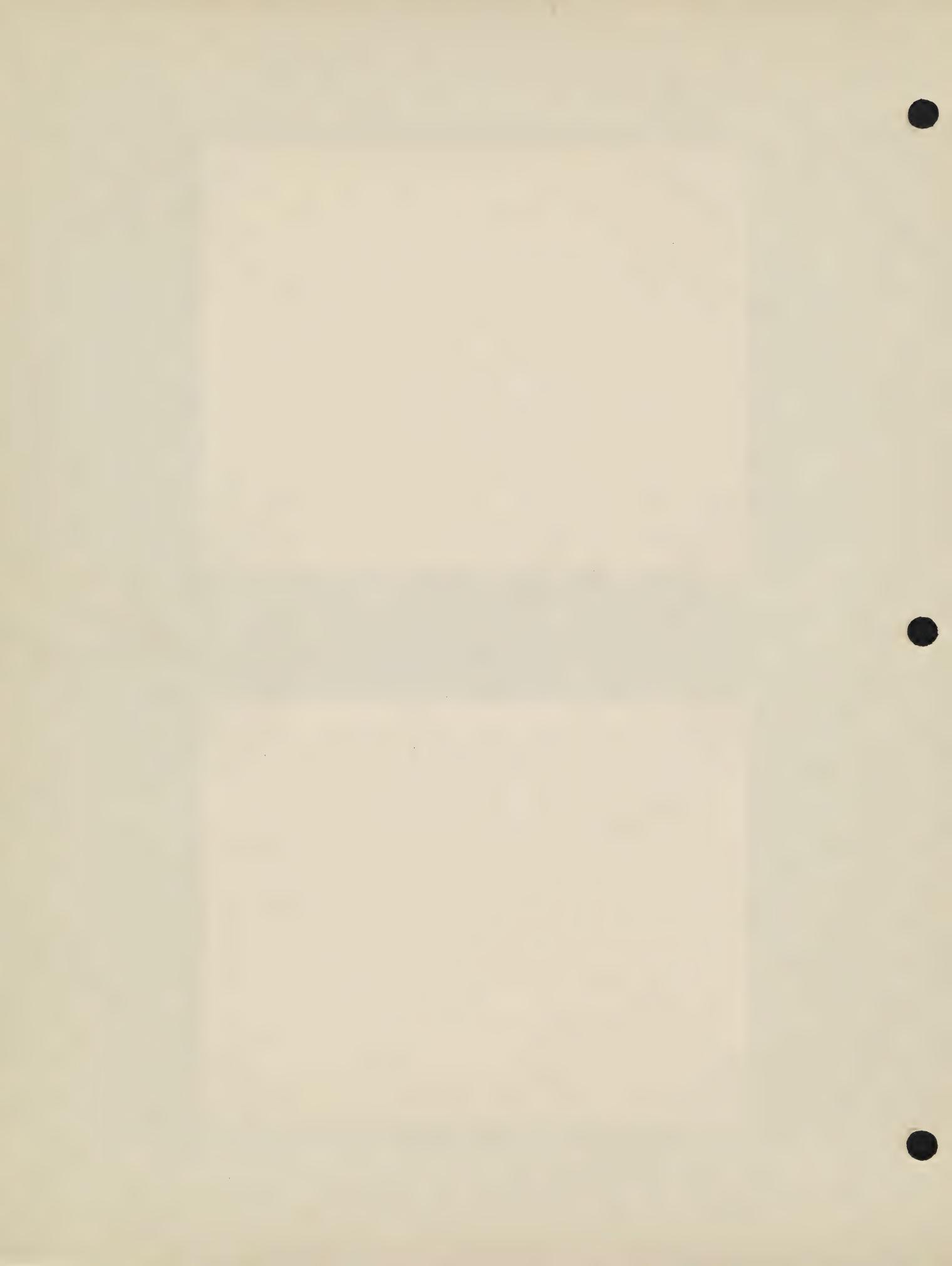
PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



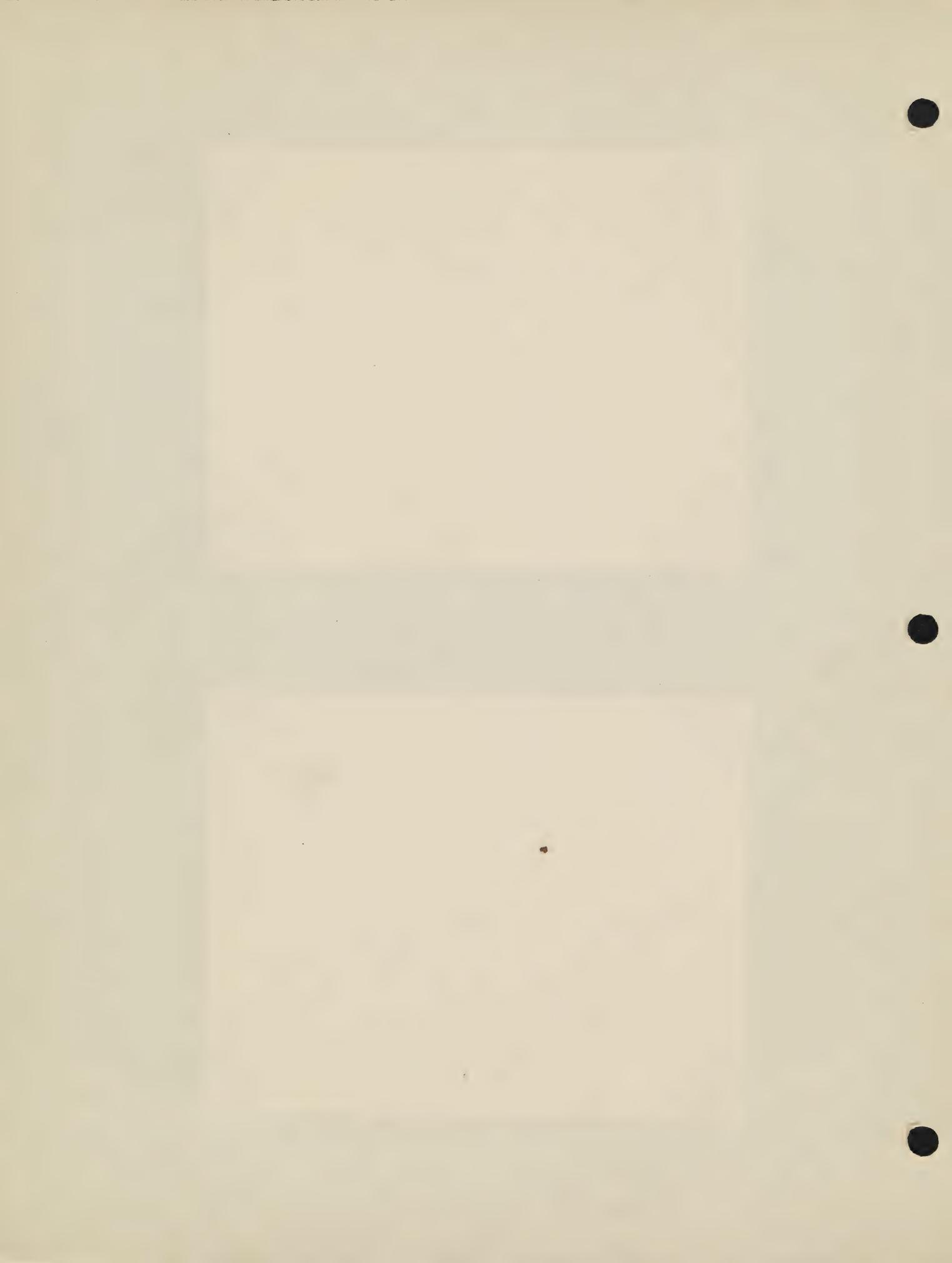
SUBJECT: Cow 173 and her first calf (No. 2) at one week of age. This cow received 30 micrograms of carotene per kilo of body weight. The calf was born blind, weak and had several convulsions the first few days after birth. The dam failed in lactation so the calf was given milk from cows at the Hayden Farm. The calf died at 87 days of age and on autopsy the principal findings were mottled kidneys and cystic pituitary.



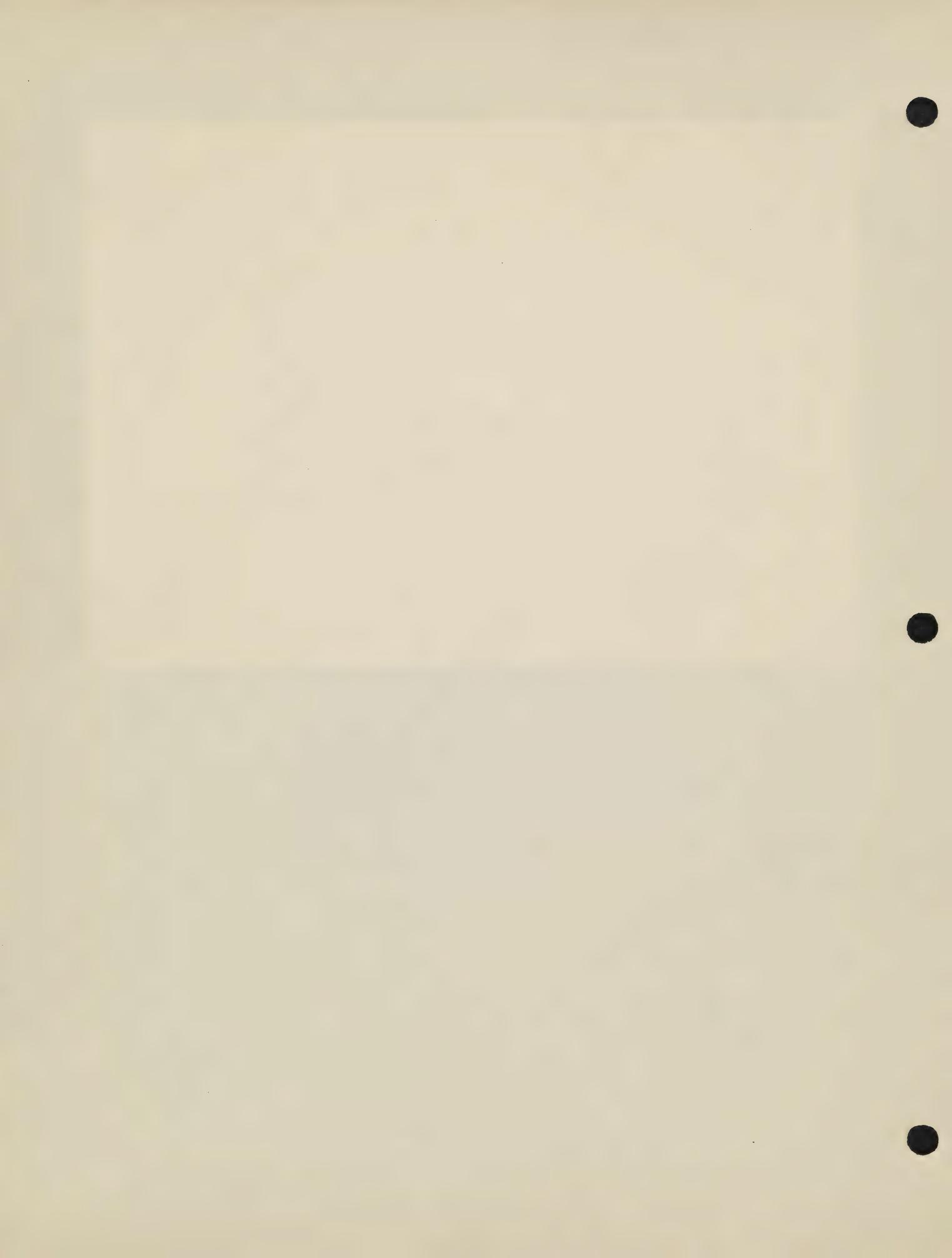






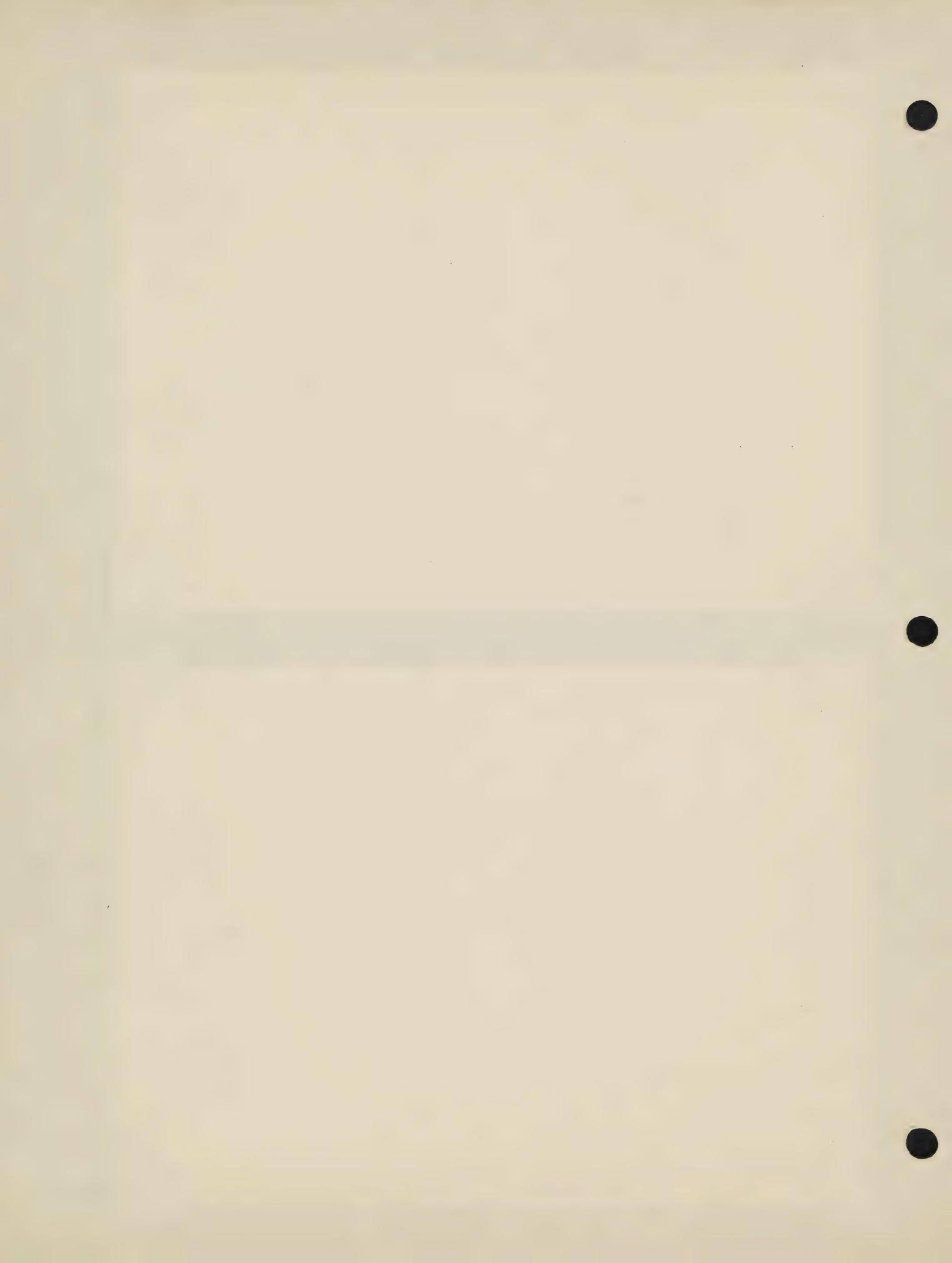














B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cow 98 and her first calf (No. 1) at 12 days of age. This cow received 60 micrograms of carotene per kilo of body weight. The calf is apparently normal.



A



B



C



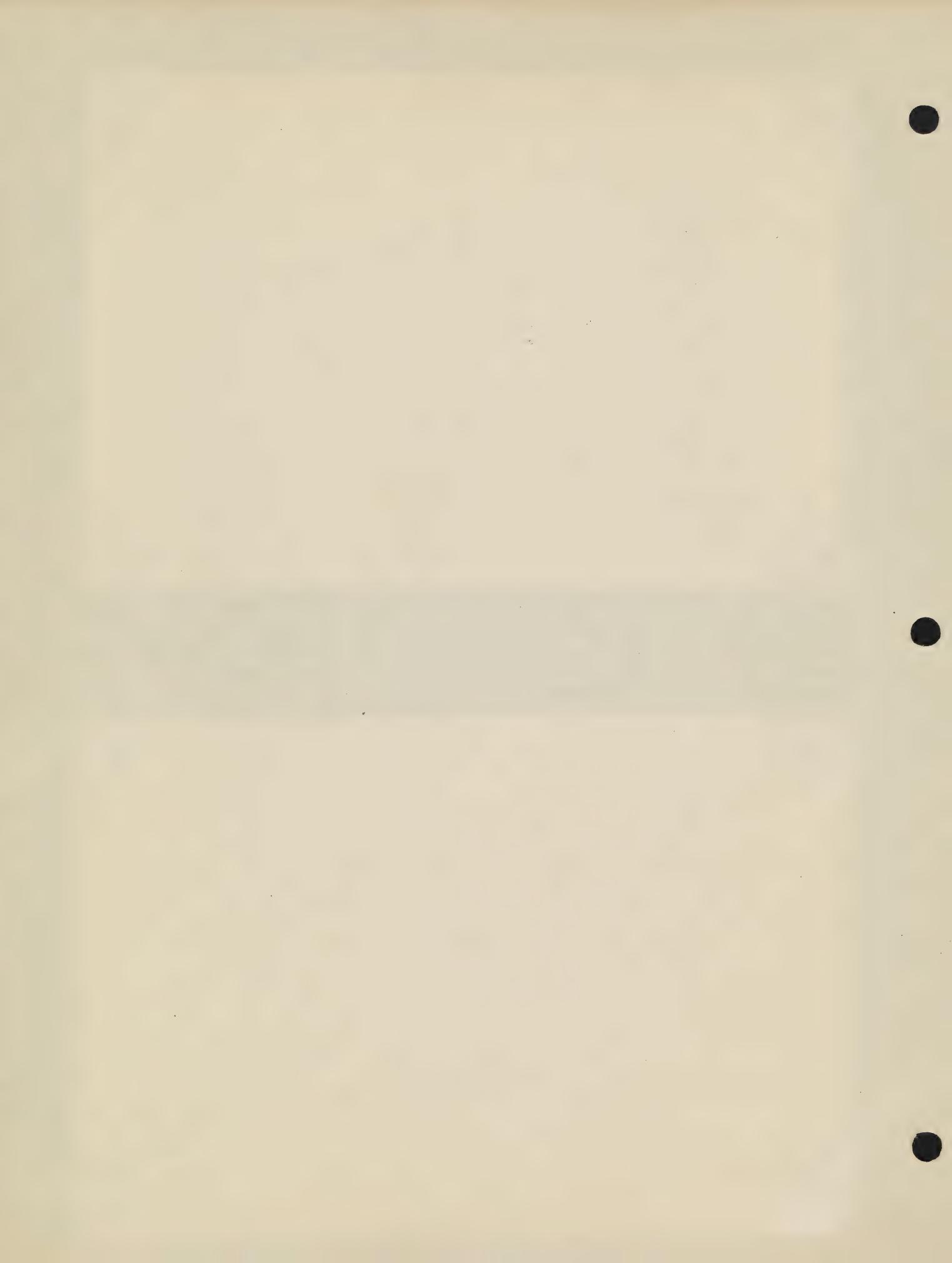
If a cow's ration is low in carotene during the gestation period, her calf may be blind and weak at birth: A, this cow is in good condition and shows no evidence of vitamin A deficiency other than low blood carotene and vitamin A. Her calf was normal in size and condition, but was unable to stand alone and had frequent convulsions. B, shows characteristic attitude during convulsion. C, note abnormal position of front legs. This calf could not stand alone until four days of age and survived only four weeks.

Bull 169.1 (Beltsville)



Because of vitamin A (carotene) starvation, this animal (above - Neg. 76819B) has poor vision and appetite, is unsteady on his feet, and is sexually impotent; he has convulsions and anasarca. After 4 months of carotene therapy, the same animal (below - Neg. 77009B of 6-5-43) apparently has regained all of his faculties.





Vitamin A deficiency in fattening steers at Spur, Texas.



Steer 96, taken 1/24/38 or 8 months after shipment from Spur to College Station. Typical of a vitamin A deficient steer.

(Tex. No. 19-1520-Exp. 7)



Steer 99, taken 1/24/38, also 8 months after shipment to College Station.

(Tex. No. 19-1520-Exp. 5)



Steer 99, taken 3/18/39, showing more advanced stage of deficiency.

(Tex. No. 19-1664-Exp. 10)

Vitamin A Deficiency



Cow No. 307 - Cow from Experiment Station dairy herd. Fed a ration deficient in vitamin A. Note discharge from eyes and nose, swellings in shoulders, legs, both front and rear, middle drawn in appearance.



Calf born from cow fed a ration containing insufficient amounts of vitamin A activity; the calf could see but died with scours within a few days after birth. Other calves have been born blind from cows receiving 2000 micrograms of crude carotene daily per 100 pounds liveweight of the animal.



Cow No. 56 came down (unable to stand) within 10 days after this picture was taken. Later fed cod-liver oil, regained her health, was bred and produced a normal calf. She received 250 cc of crude cod liver daily throughout the gestation period.

Goiter
(Iodine Deficiency)



Calf 38.1 at Beltsville showing moderate thyroid enlargement (goiter or "big neck") due to iodine deficiency. Upper view - Neg. 69646B and lower view 69647B taken 4/8/41.





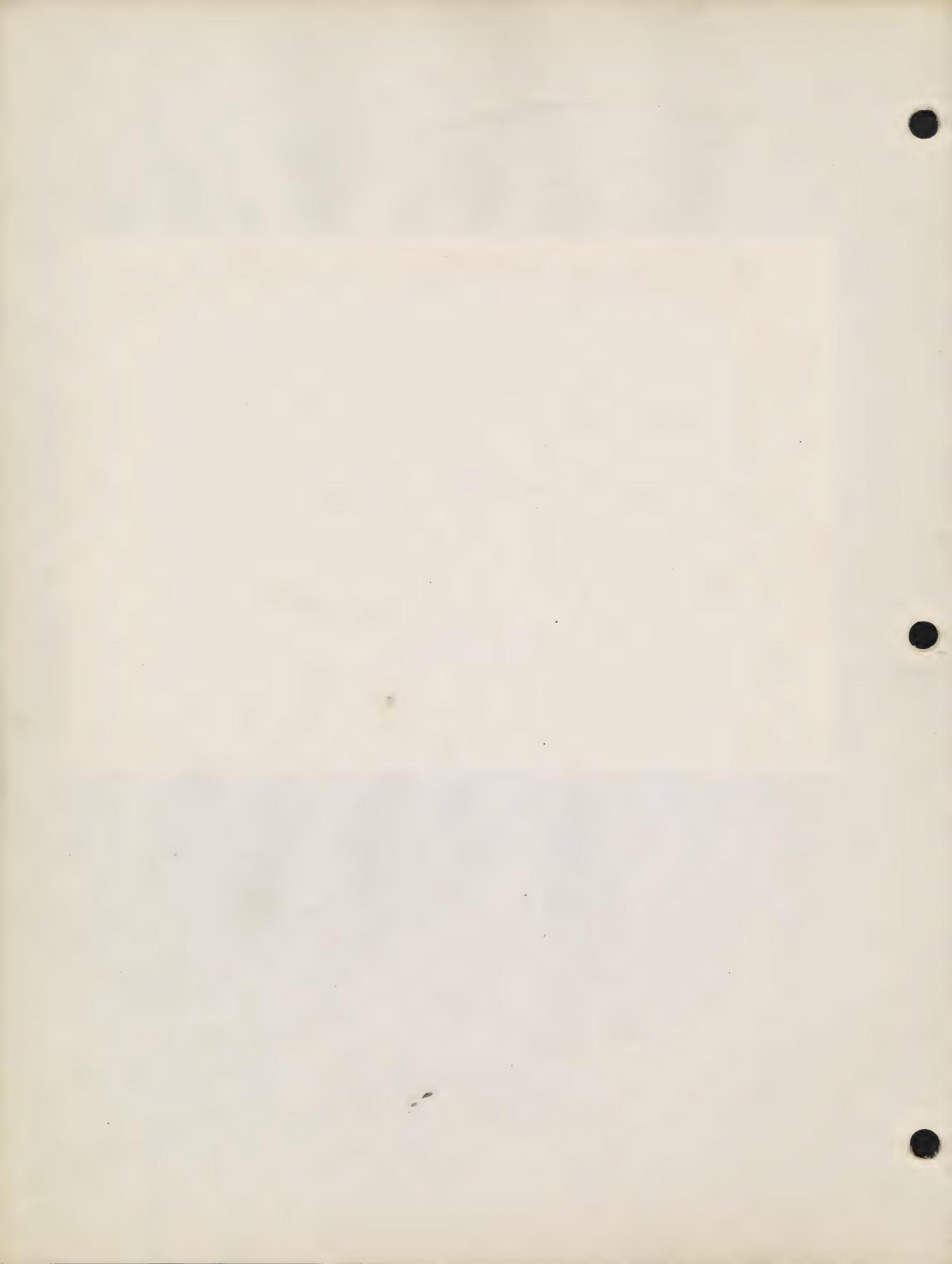
B.A.I. 605, Fiscal Year 1940

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



68641-B enlarged

SUBJECT: Calf 3 from cow 78 on 45 micrograms of carotene per kilo. This is a close-up of the eye showing dilatation of the pupil but no excessive lacrimation. The picture was taken at 43 days of age while the animal was in a convulsion that was also recorded on motion picture film.



B.A.I. 605, Fiscal Year 1940

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.

Copy of 68641-B
removed for yearbook 1942
L.H.W.

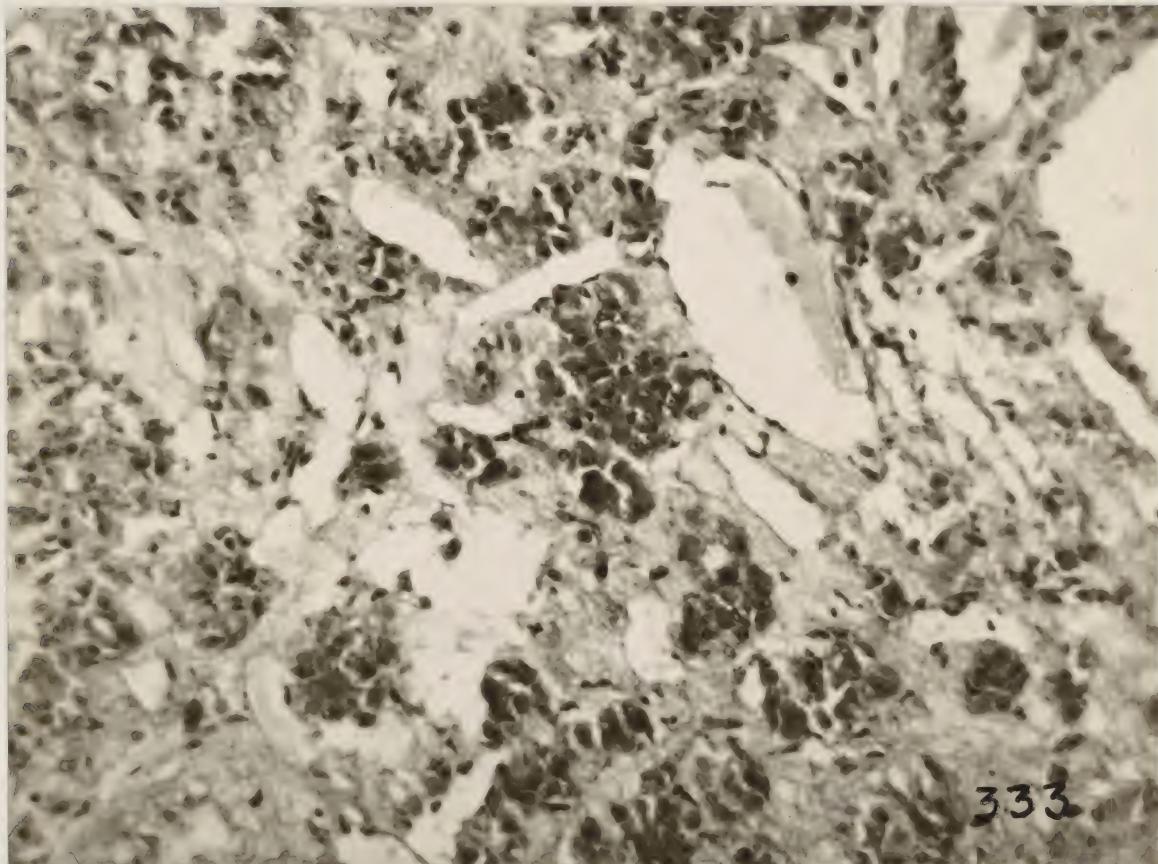


Enlarged 68642 B

SUBJECT: Calf 3, same as previous page.

B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Interior of anterior lobe of pituitary, cow 234, x 284. Note dense connective tissue stroma, nests of pituitary cells, and small cysts. See Figs. 327, 328, 323, and 334).

B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Edge of pituitary cyst (anterior lobe), cow 234, x 284. Note dense connective tissue and sparsity of glandular cells. (See Figs. 323, 327 and 328).

B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Edge of pituitary cyst (anterior lobe), cow 234, x 152. Note increase in connective tissue and pressure atrophy of glandular parenchyma (see Fig. 327 and 328)

B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cystic pituitary (anterior lobe) cow 234, (Fig. 328, x 5.8 and Fig. 327, x 10.2). This cow was depleted of vitamin A during calfhood and later given 120 micrograms of carotene per kilo of body weight. She aborted an 8-month fetus at 26 months of age. She was killed 4 days later. The cyst, formed apparently during early life, was still present and had caused considerable pressure atrophy of the glandular parenchyma.



B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cystic pituitary, calf 2, x 7.3, sagittal section. This calf was born to cow 173 that received 30 micrograms of carotene per kilo of body weight. The calf was born blind, weak and had convulsions during the first 4 days postpartum. The calf's mother failed in lactation so whole milk from normal cattle was given. The calf improved rapidly but remained blind. The calf became ill and died at 87 days of age. The other important finding at autopsy was swollen, white spotted kidneys.



B.A.I. 605, Fiscal Year 1940.

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cystic pituitary, calf 2, x 7.3; other half of pituitary gland (see Fig. 320).



B.A.I. 605, Fiscal Year 1940

PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Cystic pituitary gland, calf 3.



B.A.I. 605, Fiscal Year 1940.

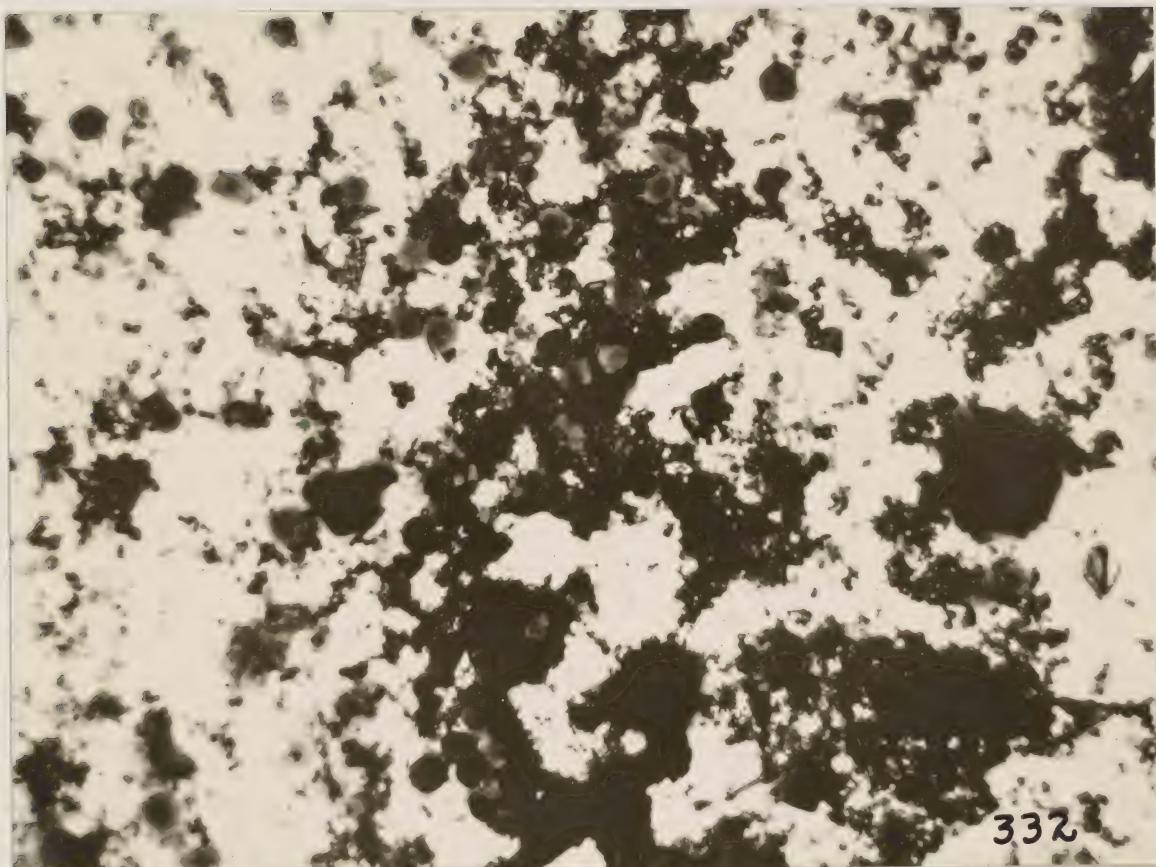
PROJECT: Vitamin A deficiency and other factors contributing to disorders of the reproductive and urinary systems of cattle.



SUBJECT: Both halves of cystic pituitary, calf 2, see Fig. 320 and 321.

Fiscal Year 1940.

PROJECT: Case of vitamin A deficiency in a colt (Susan Jane).

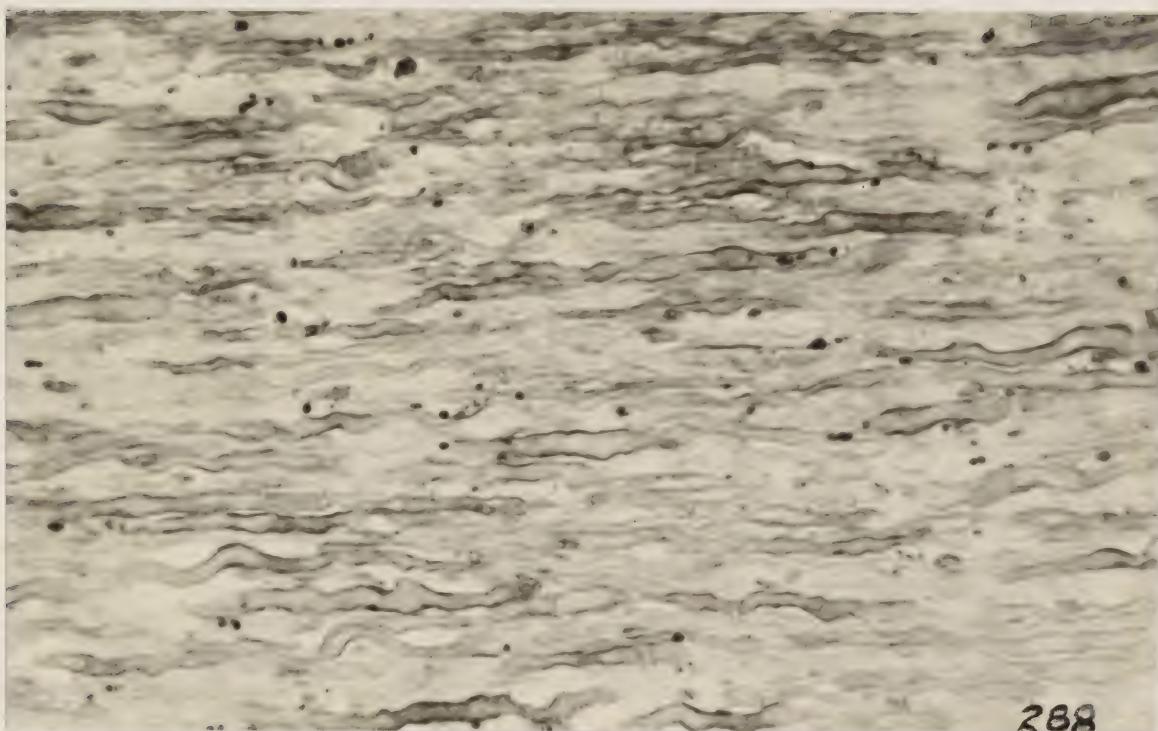


SUBJECT: Urine smear, x 284, showing cornified epithelial cells from which a diagnosis of vitamin A deficiency was made.



Fiscal Year 1939 - 40.

PROJECT: Locomotor incoordination in swine.

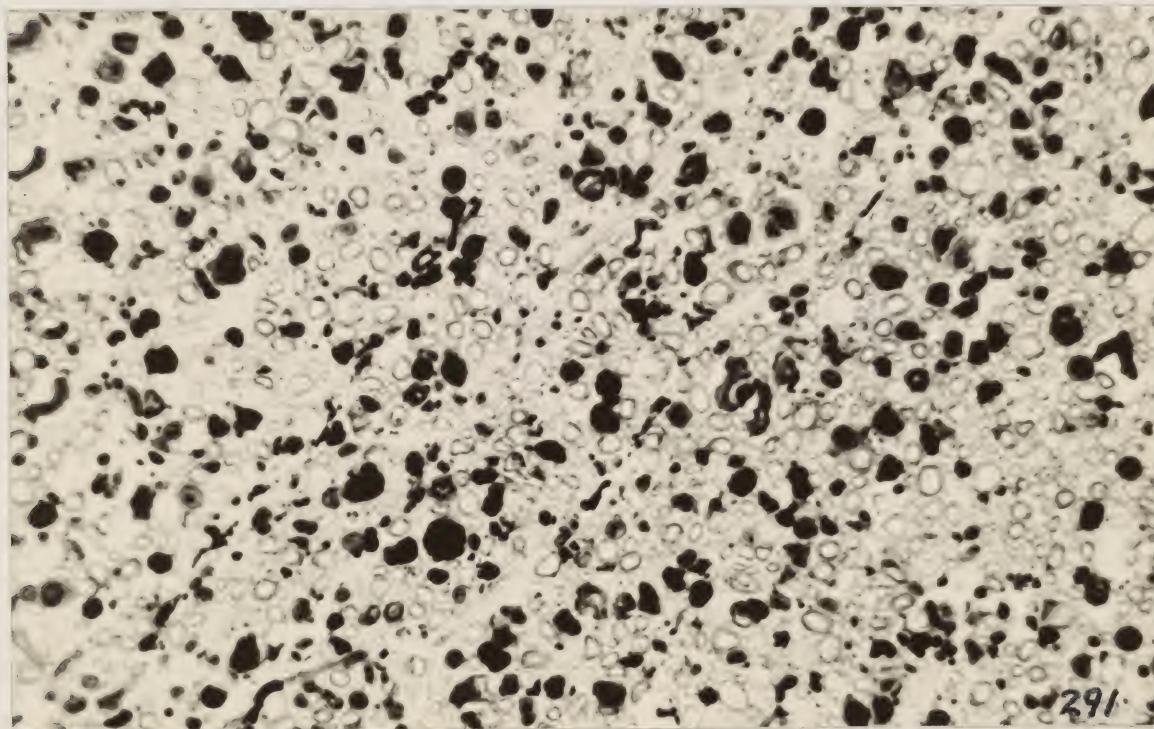
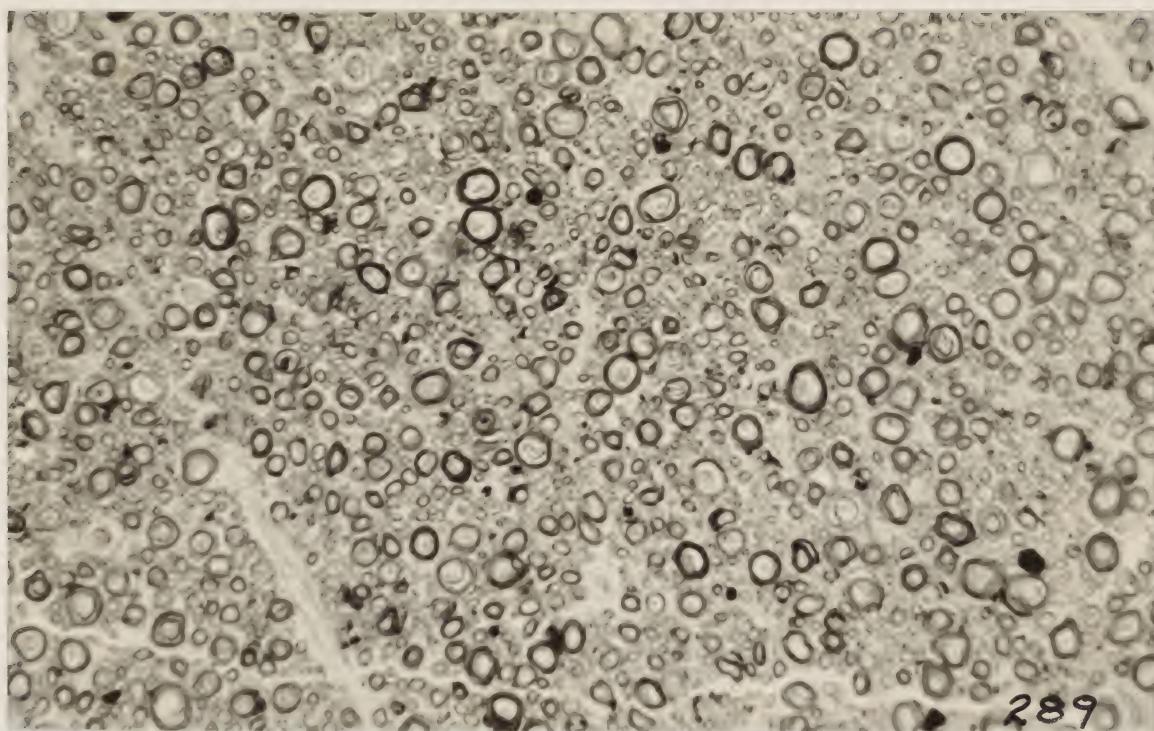


SUBJECT: Normal structure (pig 1076, Fig. 288) and demyelination (pig 2189, Fig. 287) of dorsal column of spinal cord, longitudinal section, x 284. Pig 1076 received the normal diet and pig 2189 was fed the heated normal diet.



Fiscal Year 1940.

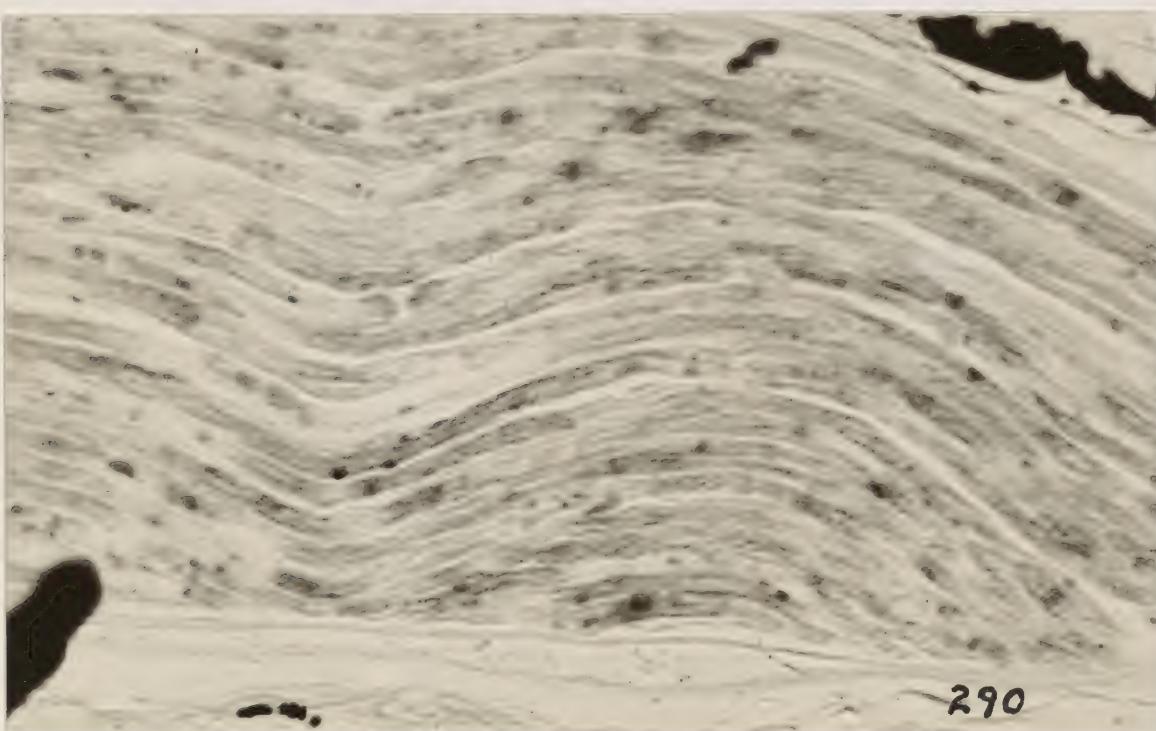
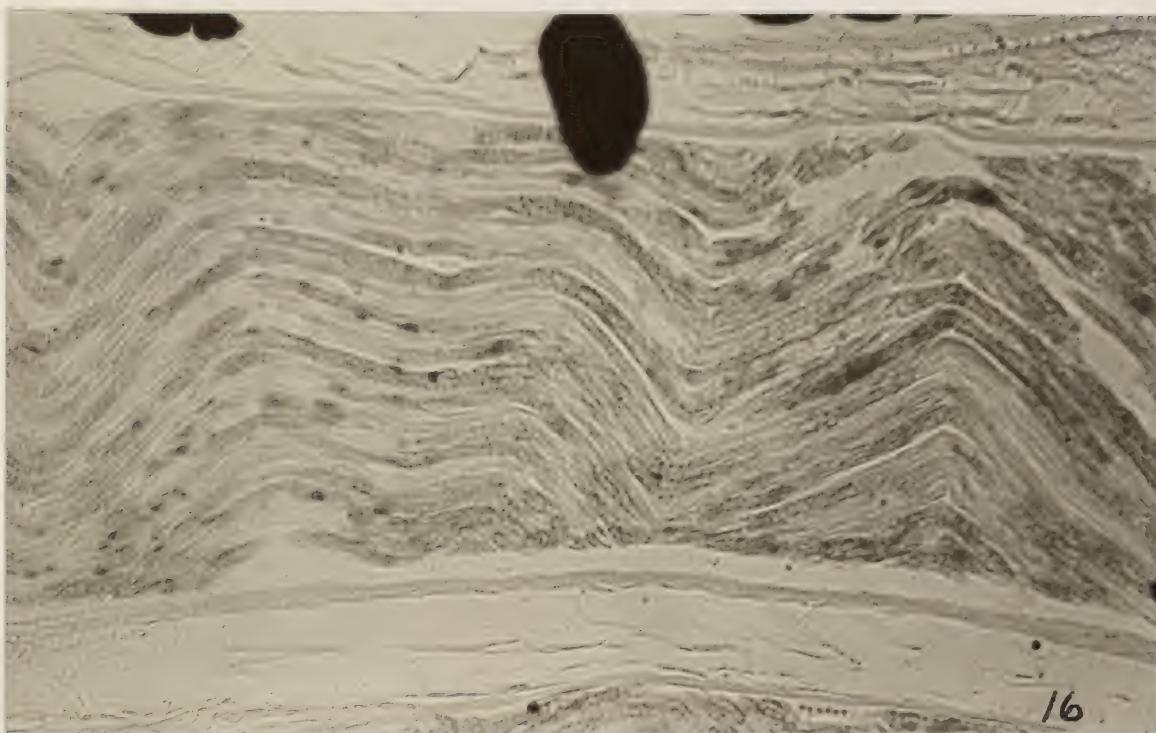
PROJECT: Locomotor incoordination in swine.



SUBJECT: Normal cross-section (pig 2254, Fig. 289) and demyelination (pig 2189, Fig. 291) of dorsal column of spinal cord. Pig 2254 received the heated normal ration supplemented with Kraco and pig 2189 was fed the heated normal ration only.

Fiscal Year 1938.

PROJECT: Locomotor incoordination in swine.

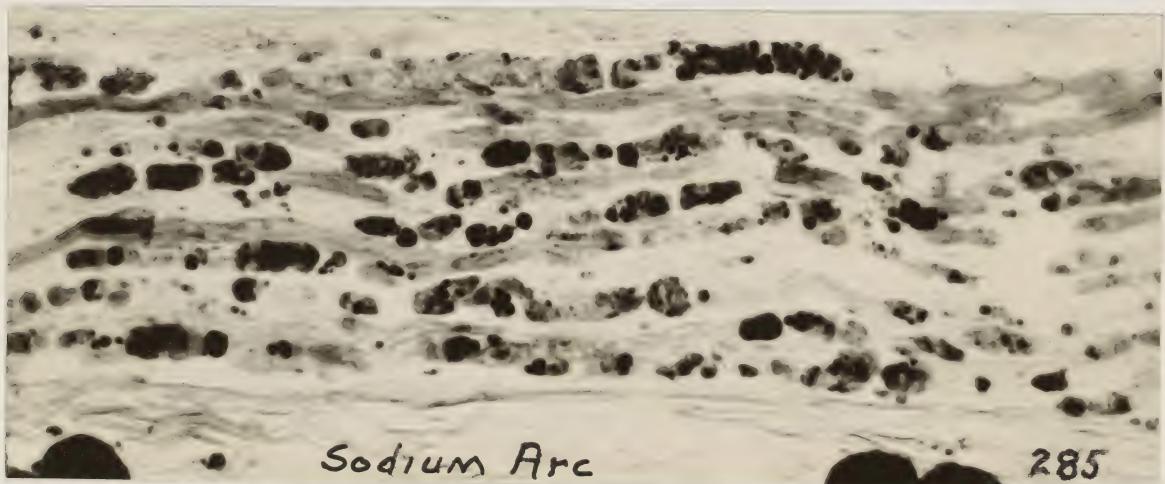
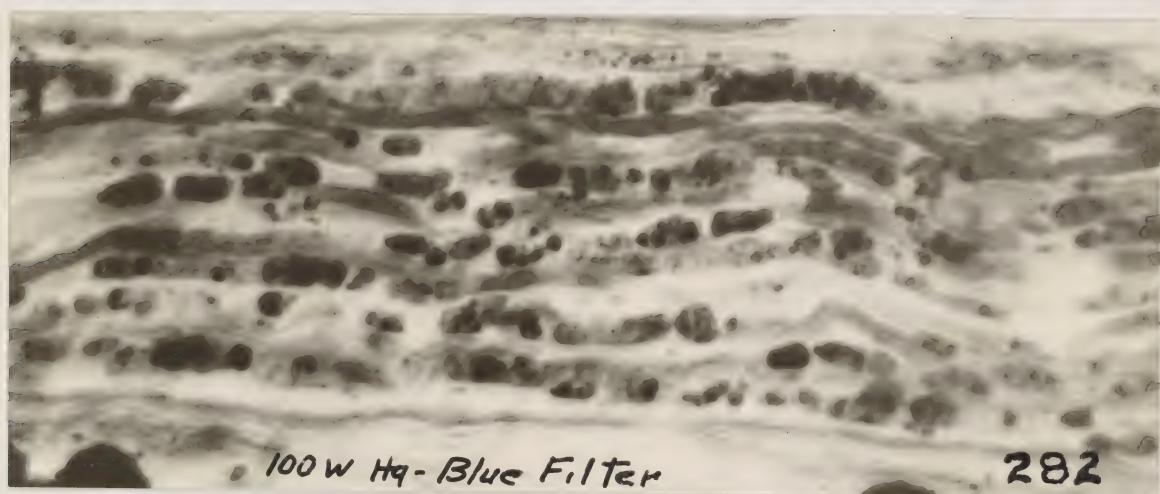


SUBJECT: Normal sciatic nerve from pig 572, x 250, and 284. This animal was on the normal control ration and did not develop incoordination.



Fiscal Year 1940.

PROJECT: Locomotor incoordination in swine.

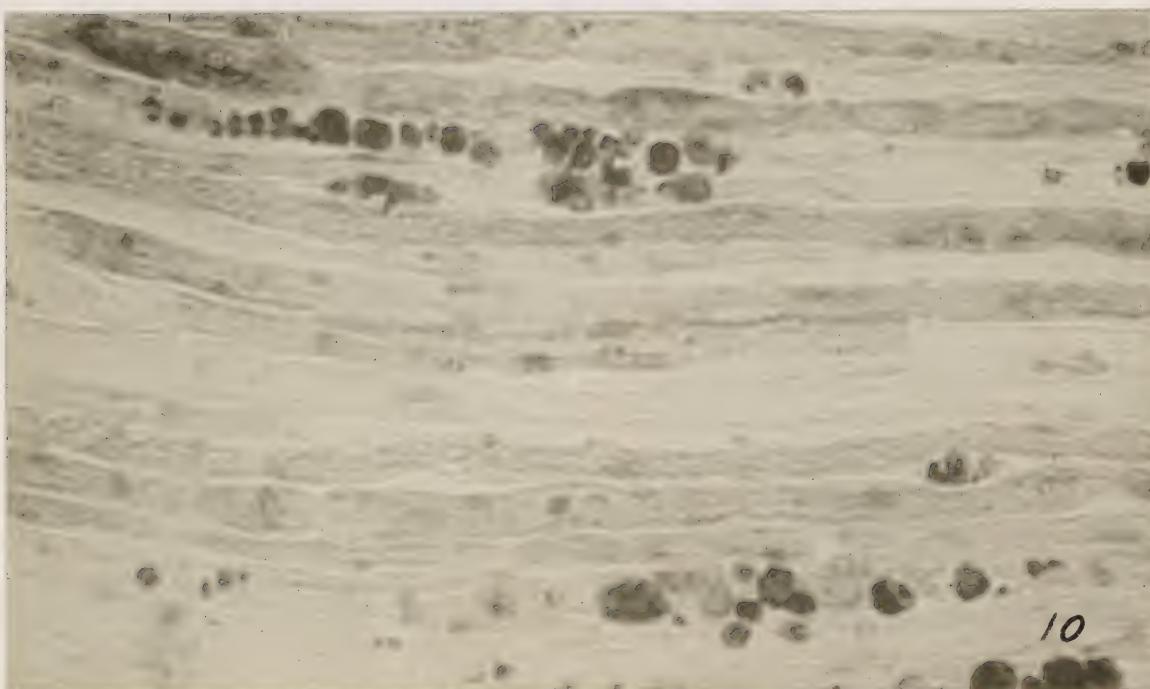


SUBJECT: Myelin degeneration of sciatic nerve, x 284, pig 2521, fed the heated normal ration. All three photographs are of the same field. Note the effect of light source and filter.



Fiscal Year 1939.

PROJECT: The vitamin B₁ requirement of swine.



SUBJECT: Myelin degeneration of sciatic nerve, x 134 and x 620, pig 1611.
This animal was fed the autoclaved diet and received 25 micrograms
of thiamine per kilo of body weight.

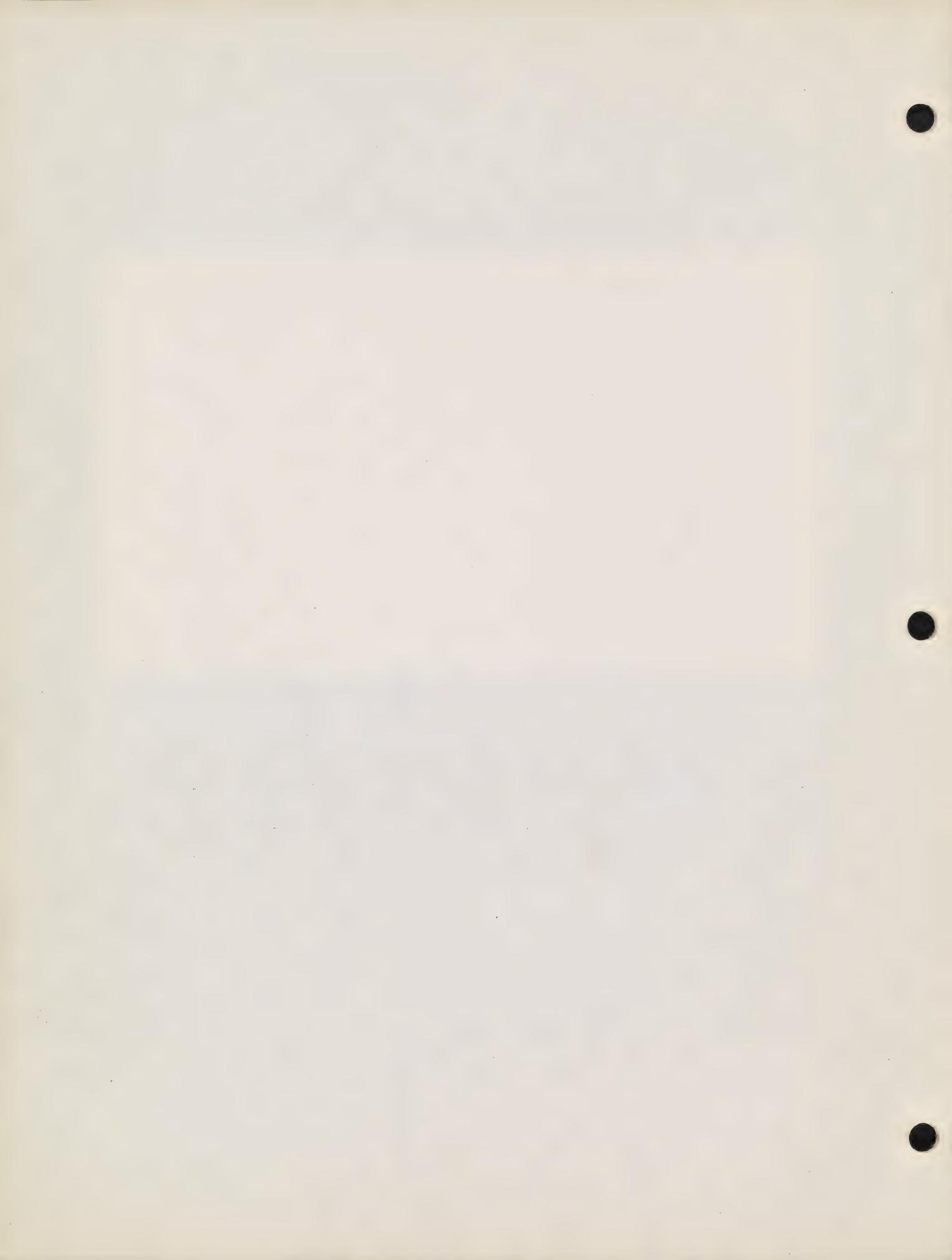


Fiscal Year 1939

PROJECT: The vitamin B₁ requirement of swine.

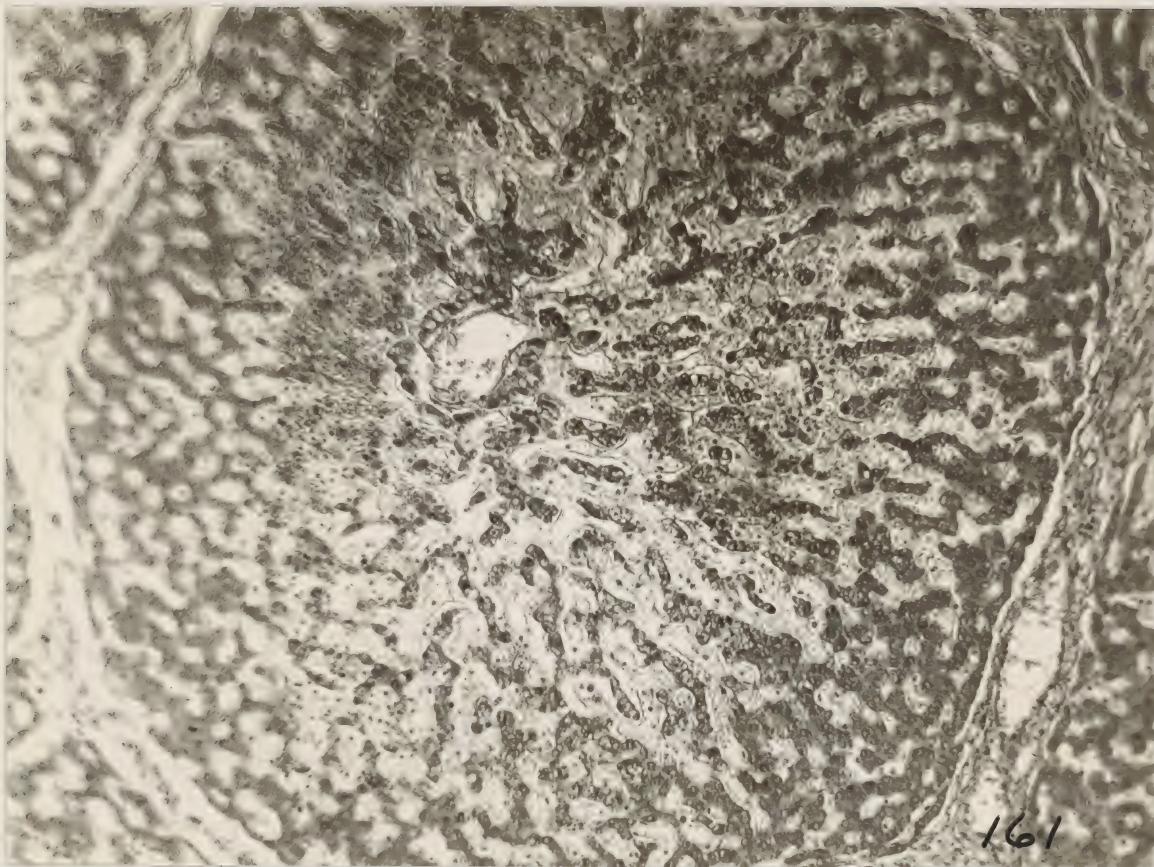


SUBJECT: Myelin degeneration of sciatic nerve, X 250, pig 1612.
This pig was on the autoclaved diet and received 50
micrograms of thiamin per kilo of body weight.



Fiscal Year 1939

PROJECT: The vitamin B₁ requirement of swine.



SUBJECT: Liver necrosis, X 152, pig 2586. This animal was on the sulfite - sulfur dioxide treated diet without thiamin addition and died from vitamin B₁ deficiency.



Fiscal Year 1941

PROJECT: The vitamin B₁ requirement of swine.

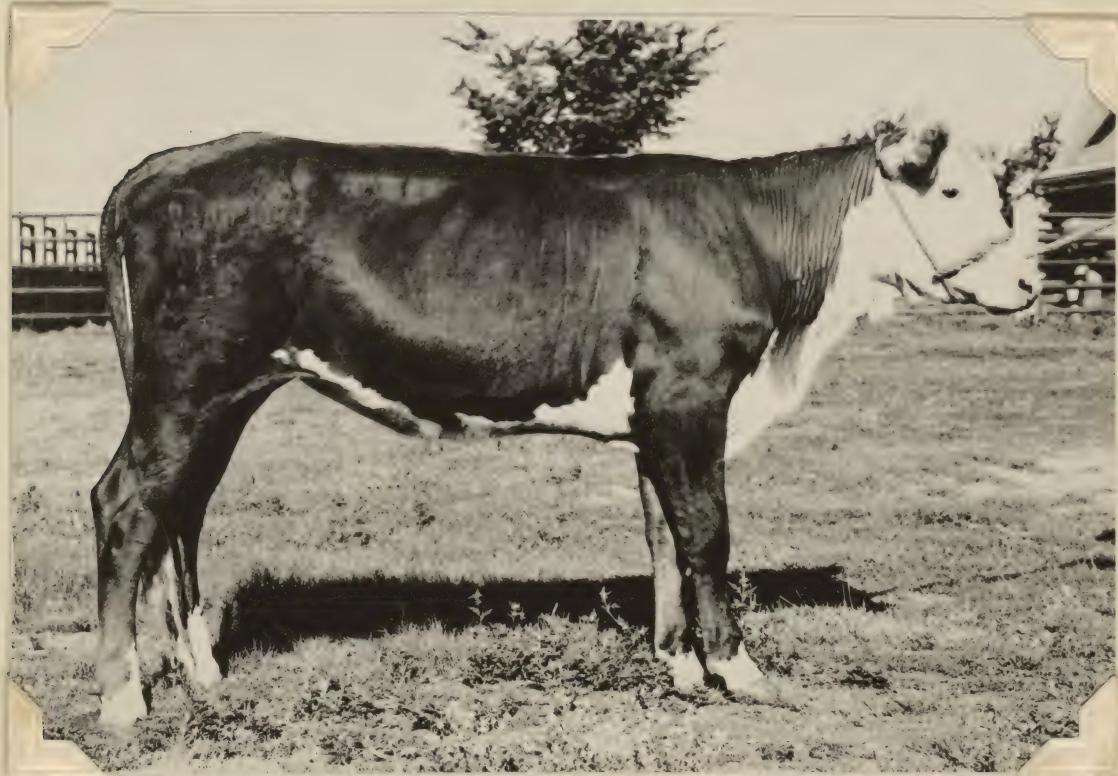


SUBJECT: Atrophy and necrosis of cardiac muscle, X 152, pig 2586.
Sulfite - sulfur dioxide treated diet, no thiamin added.

Cobalt Deficiency.

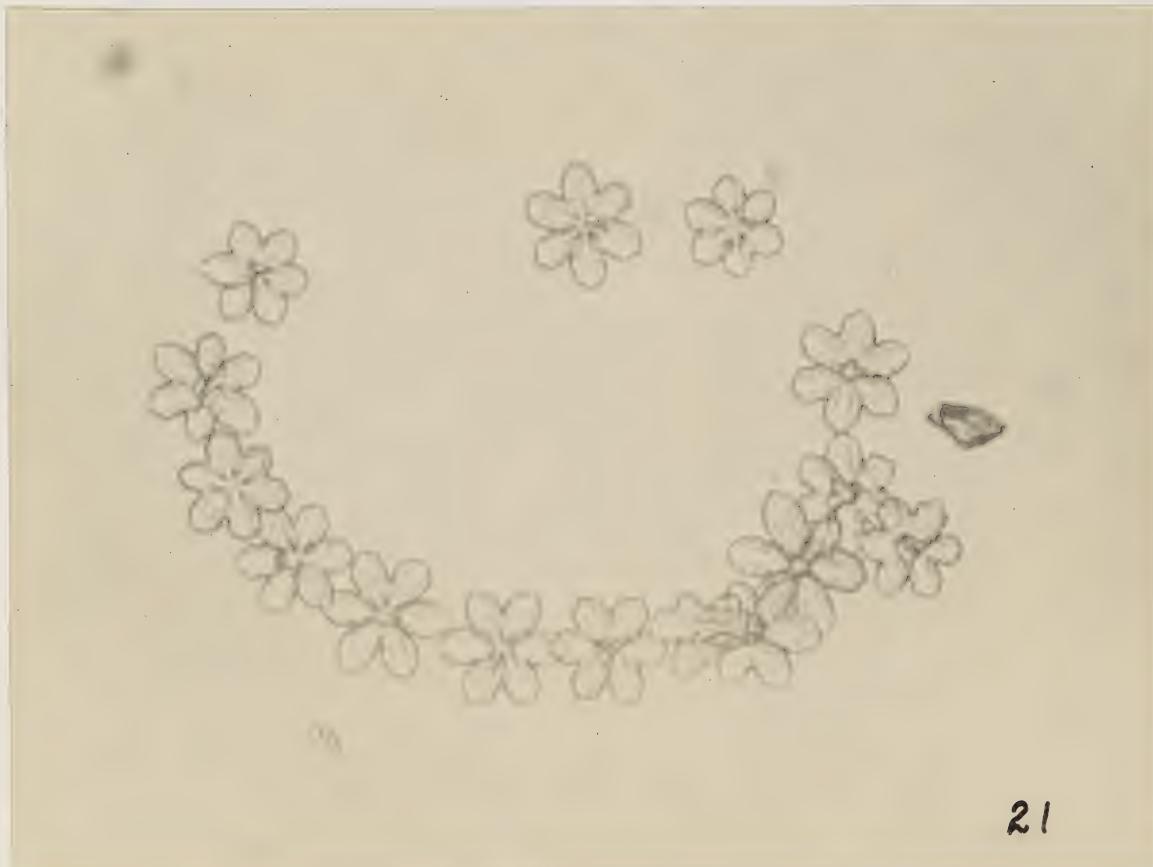


The upper picture shows a heifer suffering from anemia, lack of appetite and exhibiting the characteristic roughness of hair coat. Administration of cobalt brought about remarkable recovery of appetite and disappearance of symptoms as shown in the lower picture (Michigan Agr. Exp. Sta., East Lansing, Mich. Photo By C. F. Huffman.)



Fiscal Year 1939

PROJECT: Acute diarrhea in goats.



21

SUBJECT: Iodoform crystals X 1130, isolated from urine of goat 78 on testing for "acetone bodies". The urine also contained considerable sugar and albumin. This animal was killed while in a moribund condition on June 7, 1939. The animal had been fed six 25 cc. doses of the centrifuged contents of the small intestine diluted 1 to 1 with water from goat 46 that died on April 11, 1939. No immediate symptoms developed, but later the disease appeared to be typical.



Fiscal Year 1938

PROJECT: Acute diarrhea in goats.



SUBJECT: Site of injection of bacterial-free filtrate of small intestinal contents from goat 950 into goat 69. Note congestion of large blood vessels.

Temp

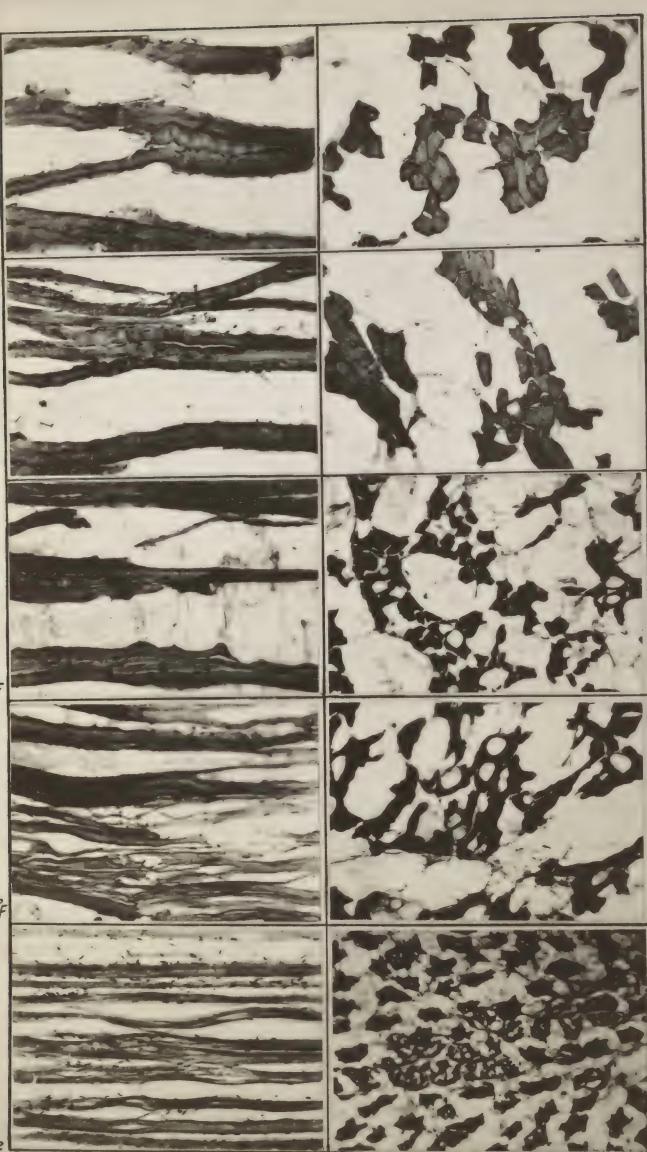
+18°F

0°F

-10°F

-40°F

Dry
Ice



X300

Fiscal Year 1938.

PROJECT: Acute diarrhea in goats.



SUBJECT: Intestinal tract of goat 69. This animal was given a subcutaneous injection of a bacteria-free filtrate of the small intestinal contents of goat 950 which died with typical symptoms of acute diarrhea. Death, intestinal congestion, enlargement of lymph nodes and engorgement of the larger veins in the abdominal viscera resulted. These findings are similar to those seen in naturally occurring cases.



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